

NASA SP-7011 (92)  
N71 - 36490



CASE FILE  
COPY

# AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY  
WITH INDEXES  
(Supplement 92)

AUGUST 1971

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

## ACCESSION NUMBER RANGES

Accession numbers cited in this Supplement fall within the following ranges:

STAR (N-10000 Series) N71-24351—N71-26800

IAA (A-10000 Series) A71-27781—A71-31136

This bibliography was prepared by the NASA Scientific and Technical Information Facility  
operated for the National Aeronautics and Space Administration by Informatics Tisco, Inc.

Use of funds for printing this publication approved by the Director of the Office of  
Management and Budget June 23, 1971.

AEROSPACE MEDICINE  
AND BIOLOGY  
A CONTINUING BIBLIOGRAPHY  
WITH INDEXES

(Supplement 92)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA Scientific and Technical Information System during July, 1971.



*Scientific and Technical Information Office*

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**  
WASHINGTON, D.C.                    AUGUST 1971

NASA SP-7011 and Supplements 1-91 are available from the National Technical Information Service (NTIS), Springfield, Virginia 22151. Questions on the availability of this bibliography on a subscription basis and on the availability of the predecessor publications, *Aerospace Medicine and Biology* (Volumes I-XI) should be directed to NTIS.

This Supplement is available from the National Technical Information Service (NTIS), Springfield, Virginia 22151 for \$3.00.

# INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 372 reports, articles, and other documents announced during July 1971 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964; since that time, irregular supplements have been issued.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied by an abstract. The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order. The citations and abstracts are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Two indexes—subject and personal author—are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1971 Supplements.

# AVAILABILITY OF CITED PUBLICATIONS

## IAA ENTRIES (A71-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc., (AIAA), as follows: Paper copies are available at \$5.00 per document up to a maximum of 20 pages. The charge for each additional page is 25 cents. Microfiche<sup>(1)</sup> are available at the rate of \$1.00 per microfiche for documents identified by the # symbol following the accession number. A number of publications, because of their special characteristics, are available only for reference in the AIAA Technical Information Service Library. Minimum airmail postage to foreign countries is \$1.00. Please refer to the accession number, e.g., A71-10613, when requesting publications.

## STAR ENTRIES (N71-10000 Series)

A source from which a publication abstracted in this Section is available to the public is ordinarily given on the last line of the citation, e.g., Avail: NTIS. The following are the most commonly indicated sources (full addresses of these organizations are listed at the end of this introduction):

- Avail: NTIS. Sold by the National Technical Information Service at a standard price of \$3.00 for hard copy (printed, facsimile, or reproduced from microcopy) of 300 pages or less. Documents in the 301 to 600 page range are sold for \$6.00 in hard copy, and those in the 601 to 900 page range are sold at \$9.00. Documents exceeding 900 pages are priced by NTIS on an individual basis. These prices apply retroactively to all documents in the NTIS collection, but in addition, documents of 300 pages or less that are over two years old (from date of announcement in *Government Reports Announcements*, or STAR for those items announced only in STAR) will have a surcharge of \$3.00 added for a total price of \$6.00. No additional surcharge will be added for documents over 300 pages.
- Microfiche is available from NTIS at a standard price of 95 cents (regardless of age) for those documents identified by the # sign following the accession number (e.g., N71-10411#) and having an NTIS availability shown in the citation.
- Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The price is given following the availability line. (An order received by NTIS for one of these documents will be filed at the SOD price if hard copy is requested. NTIS will also fill microfiche requests, at the standard 95 cent price, for those documents identified by a # symbol.)
- Avail: NASA Scientific and Technical Information Office. Documents with this availability are usually news releases or informational brochures available without charge in paper copy.
- Avail: AEC Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of U.S. Atomic Energy Commission reports, usually in microfiche form, are listed in *Nuclear Science Abstracts*. Services available from the USAEC and its depositories are described in a booklet, *Science Information Available from the Atomic Energy Commission* (TID-4550), which may be obtained without charge from the USAEC Division of Technical Information.
- Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts*, and are sold by University Microfilms as xerographic copy (HC) at \$10.00 each and microfilm at \$4.00 each, regardless of the length of the manuscript. Handling and shipping charges are additional. All requests should cite the author and the Order Number as they appear in the citation.

(1) A microfiche is a transparent sheet of film, 105 x 148 mm in size, containing up to 72 pages of information reduced to micro images (not to exceed 20:1 reduction).

- Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by British Information Services (BIS), New York City. The U.S. price (including a service charge) is given, or a conversion table may be obtained from BIS.
- Avail: National Lending Library, Boston Spa, England. Sold by this organization at the price shown. (If none is given, an inquiry should be addressed to NLL.)
- Avail: ZLDI. Sold by the Zentralstelle für Luftfahrt dokumentation und -Information, Munich, Federal Republic of Germany, at the price shown in deutschmarks (DM).
- Avail: Issuing Activity, or Corporate Author, or no indication of availability: Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.
- Avail: U.S. Patent Office. Sold by Commissioner of Patents, U.S. Patent Office, at the standard price of \$.50 each, postage free.
- Other availabilities: If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line.

#### **GENERAL AVAILABILITY**

All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR Entries* and *IAA Entries* sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

#### **ADDRESSES OF ORGANIZATIONS**

American Institute of Aeronautics  
and Astronautics  
Technical Information Service  
750 Third Ave.  
New York, N.Y. 10017

NASA Scientific and Technical Information Facility  
P.O. Box 33  
College Park, Maryland 20740

British Information Service  
845 Third Ave.  
New York, N.Y. 10022

National Aeronautics and Space Administration  
Scientific and Technical Information Office (KSI)  
Washington, D.C. 20546

Commissioner of Patents  
U.S. Patent Office  
Washington, D.C. 20231

ESRO/ELDO Space Documentation Service  
European Space Research Organization  
114, av. de Neuilly  
92-Neuilly-sur-Seine, France

National Lending Library for Science and Technology  
Boston Spa, Yorkshire, England

Her Majesty's Stationery Office  
P.O. Box 569, S.E. 1  
London, England

National Technical Information Service  
Springfield, Virginia 22151

Superintendent of Documents  
U.S. Government Printing Office  
Washington, D.C. 20402

University Microfilms  
A Xerox Company  
300 North Zeeb Road  
Ann Arbor, Michigan 48106

University Microfilms, Ltd.  
Tylers Green  
London, England

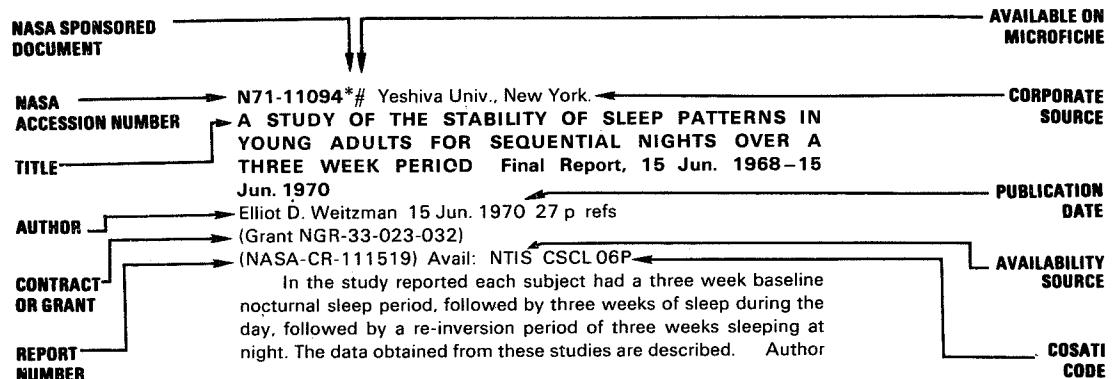
U.S. Atomic Energy Commission  
Division of Technical Information  
P.O. Box 62  
Oak Ridge, Tennessee 37830

Zentralstelle für Luftfahrt dokumentation und -Information  
8 München 86  
Postfach 880  
Federal Republic of Germany

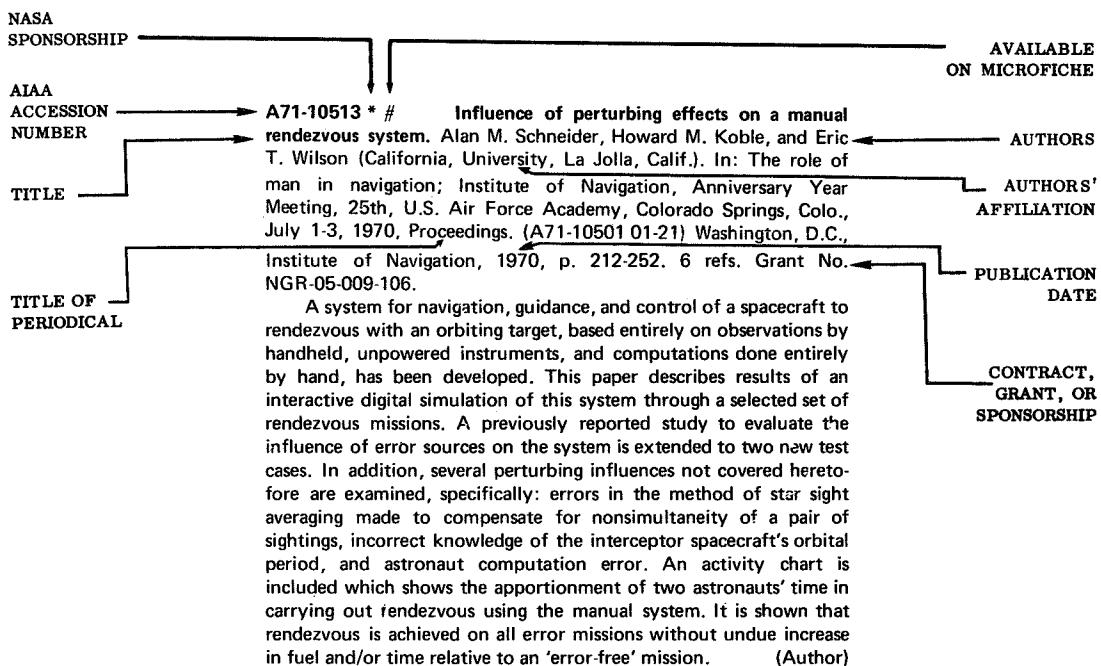
# TABLE OF CONTENTS

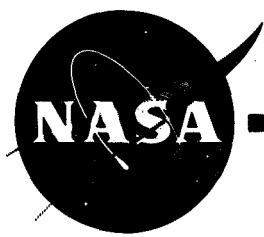
	Page
<b>IAA Entries (A71-10000) . . . . .</b>	<b>351</b>
<b>STAR Entries (N71-10000) . . . . .</b>	<b>387</b>
<b>Subject Index . . . . .</b>	<b>I-1</b>
<b>Personal Author Index . . . . .</b>	<b>I-45</b>

## TYPICAL CITATION AND ABSTRACT FROM STAR



## TYPICAL CITATION AND ABSTRACT FROM IAA





# AEROSPACE MEDICINE AND BIOLOGY

*A Continuing Bibliography (Suppl. 92)*

AUGUST 1971

## IAA ENTRIES

**A71-27810 #** Functional-biochemical changes in the brains of rats during the initial stage of increased oxygen pressure (Funktional'no-biokhimicheskie izmeneniiia v mozgi krys v nachal'nuju stadiu deistvia povyshennogo davlenija kisloroda). M. N. Maslova and L. V. Reznik (Akademija Nauk SSSR, Institut Evoliucionnoj Fiziologii i Biokhimii, Leningrad, USSR). *Akademija Nauk SSSR, Doklady*, vol. 197, Mar. 11, 1971, p. 494-496. 13 refs. In Russian.

Study of the functional-biochemical shifts in the central nervous system of rats during the initial stage of exposure to increased oxygen pressure. An orientational-investigative reaction, which was compared with the acetylcholine esterase activity in the brain hemispheres, was used as the index of the functional state of the central nervous system. It is shown that during the initial stage of exposure to increased oxygen pressure a considerable acceleration of the orientational-investigative reaction occurs, as well as an increase in acetylcholine esterase activity. It is confirmed by tests of the orientational-investigative reaction and the acetylcholine esterase activity under the action of typical stressor agents (adrenamine, adrenalin, and amphetamine) that the observed shifts in acetylcholine esterase activity and the behavioral reaction are not only the reflection of adaptive reactions of the organism but of nonspecific reactions to enhanced oxygen pressure. Still further confirmation that the initial stage of exposure to enhanced oxygen pressure is characterized by the occurrence of nonspecific shifts in the organism is obtained from tests showing a decrease in the ascorbic acid content in the adrenal glands during this stage. A.B.K.

**A71-27811** Extrinsic factors in the genesis of congenital heart disease. Maria V. de la Cruz, Luis Muñoz-Castellanos, and Bernardo Nadal-Ginard (National Institute of Cardiology, Mexico City, Mexico). (*Jornadas Internacionales de Cardiología, Mexico City, Mexico, Oct. 20-22, 1969.*) *British Heart Journal*, vol. 33, Mar. 1971, p. 203-213. 58 refs.

An hypothesis is proposed regarding the pathogenesis of congenital heart disease taking into consideration Saxen and Rapola's work (1969) as a starting point. The hypothesis is based on the alteration of the morphogenetic processes which normally participate in the development of the heart and the great vessels, such as the morphogenetic movements, growth, and degeneration, the disturbance of which originates those malformations. The main objectives to be attained in a program of prevention of congenital heart disease caused by extrinsic factors are pointed out. G.R.

**A71-27812** Normal ranges of modified axial lead system electrocardiogram parameters. Peter W. Macfarlane, A. R. Lorimer, and T. D. V. Lawrie (Royal Infirmary, Glasgow, Scotland). *British Heart Journal*, vol. 33, Mar. 1971, p. 258-265. 9 refs.

The normal ranges of 3 orthogonal lead electrocardiogram parameters, derived from the modified axial lead systems, have been determined by computer analysis. A discussion of the clinically significant parameters is presented, and for those who may not wish to use the modified version of the axial system the calculation of ranges for the original axial system is detailed in an Appendix.

(Author)

**A71-27813** 3 and 12 lead electrocardiogram interpretation by computer - A comparison on 1093 patients. Peter W. Macfarlane, A. R. Lorimer, and T. D. V. Lawrie (Royal Infirmary, Glasgow, Scotland). *British Heart Journal*, vol. 33, Mar. 1971, p. 266-274. 24 refs.

A comparative study of computer interpretations of 3 and 12 lead electrocardiograms from 1093 patients is reported. The conclusion reached is that 3 lead electrocardiography is clinically as acceptable as 12 lead electrocardiography with respect to computer assisted interpretation. (Author)

**A71-27814** Echocardiography of the mitral valve in aortic valve disease. R. B. Pridie, R. Benham, and C. M. Oakley (London Hospital; Hammersmith Hospital, London, England). *British Heart Journal*, vol. 33, Mar. 1971, p. 296-304. 16 refs. Research supported by the British Heart Foundation.

Ultrasonic echocardiograms from the anterior cusp of the mitral valve have been obtained in 75 patients with aortic regurgitation in whom there was haemodynamic or surgical confirmation, or both, of the state of the mitral valve. Coincident mitral stenosis could be recognized from the echocardiogram in all cases by a slow diastolic closure rate and widening of the echo from the anterior mitral cusp. Two origins of the Austin Flint murmur are suggested. Echocardiograms of the mitral valve can be used to differentiate organic from functional mitral diastolic murmurs in patients with aortic regurgitation. G.R.

**A71-27832 #** Effect of direct electrical stimulation of musculus tensor tympani on click-elicited potentials in the cochlea and cochlear nucleus (Vlijanie priamogo elektricheskogo razdrzhenija myshtsy, natiagivaiushchei barabannuiu pereponku, na potentsialy ulitki i kokhlearnogo iadra, voznikshie v otvet na kratkovremennoe zvukovoe razdrzhenie). Z. Sh. Kevanishvili and Z. V. Gvakharia (Tbilisskij Gosudarstvennyj Institut Usovershenstvovaniia Vrachei, Tiflis, Georgian SSR). *Akademija Nauk Gruzinskoi SSR, Soobshchenija*, vol. 61, Jan. 1971, p. 165-168. 7 refs. In Russian.

Electrical stimulation of m. tensor tympani in anesthetized cats resulted in an amplitude diminution of click-elicited responses in the cochlea and cochlear nucleus. Changes in the microphone potentials were relatively more pronounced. The amplitude of potentials of the cochlea and cochlear nucleus during slight tetanic stimulation of the muscle showed an initial decrease and then gradually restored to normal. Some interpretations of the results obtained are proposed. M.V.E.

## A71-27833

**A71-27833 # Joint action of various afferents in the regulation of human posture reactions (Sovmestnoe uchastie razlichnykh afferentov v regulatsii poznykh reaktsii cheloveka).** A. M. El'ner (Akademii Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR) and G. V. Mamasakhlisov (Tbilisskii Gosudarstvennyi Universitet, Tiflis, Georgian SSR). *Akademii Nauk Gruzinskoi SSR, Soobshcheniya*, vol. 61, Jan. 1971, p. 173-176. 5 refs. In Russian.

By temporary exclusion of various afferents, their participation was studied in the involuntary reactions which ensure the maintenance of vertical body position. Impulses originating in joints provide appropriate differential reactions, though they are comparatively slow, weak, and primitive. Impulses from muscles give speed and power to reactions which arise during artificial posture disturbances. They also evoke synergic action from antagonist muscles which enhances motor reaction precision and economy. Impulses from other (distal) muscles and joints support these reactions. No participation of cutaneous impulses in these reactions was found. M.V.E.

**A71-27836 Changes in the somatosensory cortical evoked potential produced by hypovolemic shock.** Ernest P. McCutcheon, Donald T. Frazier, and Louis L. Boyarsky (Kentucky, University, Lexington, Ky.). *Society for Experimental Biology and Medicine, Proceedings*, vol. 136, Apr. 1971, p. 1063-1067. 8 refs. NIH Grant No. NS-09240-01; Contract No. AF 44(620)-69-C-0127.

Cortical and cuneate evoked responses and electroencephalograms were studied during the various stages of hypovolemic shock. In 16 out of 18 animals, a decrease in amplitude of the cortical evoked response preceded or was concomitant with the period of spontaneous uptake of blood. Changes in amplitude and frequency of the electroencephalogram paralleled the changes noted in the cortical response but were much more variable. There was no correlation between changes in systemic blood gas levels of pH and the disappearance of the electrical responses. The fall in evoked cortical potential appears to provide a good indication of impending failure to maintain systemic arterial pressure. O.H.

**A71-27837 Effects of boranes upon tissues of the rat. III - Tissue amino acids in rats on a pyridoxine-deficient diet.** Juanita H. Landez and Walter N. Scott (USAF, School of Aerospace Medicine, Brooks AFB, Tex.; Mount Sinai Graduate School; Mount Sinai Medical School, New York, N.Y.). *Society for Experimental Biology and Medicine, Proceedings*, vol. 136, Apr. 1971, p. 1389-1393. 9 refs. PHS Grant No. AM-13135.

Dietary pyridoxal deficiency was found to cause extensive changes, mostly reductions, in the amino acid content of the liver and kidneys, and to a lesser extent, the brain and heart. Treatment of pyridoxal-deficient rats with intraperitoneal decaborane tended to accentuate the changes induced by pyridoxal deficiency. The data support the suggestion that boron hydrides (borane) are effective inhibitors of pyridoxal-dependent enzyme systems in vivo. O.H.

**A71-27839 Relative importance of nervous control of cardiac output and arterial pressure.** William A. Dobbs, Jr., John W. Prather, and Arthur C. Guyton (Mississippi, University, Jackson, Miss.). *American Journal of Cardiology*, vol. 27, May 1971, p. 507-512. 17 refs. Research supported by the American Heart Association; PHS Grants No. HE-11678; No. HE-08375.

Experiments carried out in intact dogs and in dogs with all or most of the central nervous system destroyed show that the nervous system plays a very powerful role in controlling arterial pressure when several types of acute circulatory stress tend to alter the pressure from normal. On the other hand, control of cardiac output in response to these same stresses is, by quantitative comparison, far less affected by the presence or absence of a functional nervous system. O.H.

**A71-27858 British Cardiac Society and British Heart Foundation, World Congress of Cardiology, 6th, London, England, September 6-12, 1970, Proceedings.** Congress co-sponsored by the International Society of Cardiology. *British Heart Journal*, vol. 33, Mar. 1971, Supplement. 206 p.

The topics include the structure and function of the normal myocardium, ventricular septal defect, myocardial hypertrophy, experimental prevention of acute cardiac insufficiency, progress in the primary prevention of acute myocardial infarction, regulation of pulmonary and peripheral circulation, hypertension and arterial disease, and automation in cardiology. M.M.

**A71-27859 # Structure and function of the normal myocardium.** Eugene Braunwald (California, University, San Diego, Calif.). *(British Cardiac Society and British Heart Foundation, World Congress of Cardiology, 6th, London, England, Sept. 6-12, 1970.) British Heart Journal*, vol. 33, Mar. 1971, Supplement, p. 3-8. 8 refs. PHS-supported research.

Discussion of different aspects of myocardial mechanics. The contraction of the intact ventricle is considered together with the control of cardiac performance and cardiac output, myocardial contractility, and ventricular afterload. It is pointed out that the various influences acting on cardiac performance interact in a complex fashion to maintain cardiac output at a level appropriate to the requirements of the metabolizing tissues, and in a normal individual interference with one or even a few of these mechanisms may not influence the cardiac output. Presumably other factors, such as an increase in the frequency of sympathetic nerve impulses reaching the heart, will in the normal individual augment contractility and sustain output under these circumstances. M.M.

**A71-27860 # Regulation of coronary blood flow.** Richard Gorlin (Peter Bent Brigham Hospital, Boston, Mass.). *(British Cardiac Society and British Heart Foundation, World Congress of Cardiology, 6th, London, England, Sept. 6-12, 1970.) British Heart Journal*, vol. 33, Mar. 1971, Supplement, p. 9-14. 18 refs. Research supported by the Heart Research Foundation and PHS.

Coronary blood flow is dependent upon arterial pressure, diastolic time, and small vessel resistance. The system is regulated to achieve a low flow, high oxygen extraction and low myocardial PO<sub>2</sub>. This setting is sensitive to change in oxygen needs. Regulation of blood flow occurs primarily through local intrinsic regulation, most likely through production of vasodilating metabolites in response to minimal degrees of ischaemia. Local regulation appears to dominate over remote regulation in most circumstances. Blood flow distribution to the myocardium is depth dependent as well as regional in variation. Both types of distribution of blood flows are profoundly disturbed in the presence of obstructive coronary atherosclerosis. This results in either concentric myocardial shells or patchy transmural zones of selective ischaemia with clear-cut but local abnormalities in metabolism and performance. (Author)

**A71-27861 # Regulation of the pulmonary circulation.** G. de J. Lee (Radcliffe Infirmary, Oxford, England). *(British Cardiac Society and British Heart Foundation, World Congress of Cardiology, 6th, London, England, Sept. 6-12, 1970.) British Heart Journal*, vol. 33, Mar. 1971, Supplement, p. 15-26. 42 refs.

Factors regulating pressure and flow in the lungs are reviewed with particular emphasis on their role in regulating blood flow velocity and distribution within the lung capillaries. The behavior of the pulmonary arterial system, alveolar capillaries, and pulmonary venous system are considered individually. The effect of heart disease on lung capillary blood flow is examined. (Author)

**A71-27862 # Ventricular septal defect - Incidence, morbidity, and mortality in various age groups.** J. D. Keith, V. Rose, G. Collins, and B. S. L. Kidd (Hospital for Sick Children, Toronto, Ontario, Canada). *(British Cardiac Society and British Heart Founda-*

tion, World Congress of Cardiology, 6th, London, England, Sept. 6-12, 1970.) British Heart Journal, vol. 33, Mar. 1971, Supplement, p. 81-87. 19 refs. Research supported by the Ontario Heart Foundation.

A brief survey of information obtained in the past on the incidence of isolated ventricular septal defects from certain specific points of view is made. An investigation of the true prevalence of ventricular septal defect and the various responses to it of the human body is described. A tabulation shows a comparison of the six groups investigated. Comparing children or infants seen in the first year of life with the same group an average of 7.5 yr later, there is a moderately high incidence of haemodynamic group 1 (according to the classification of Kidd, et al., 1965) with small defects in the first year of life, but the percentage increases at 7.5 yr from 50 to 71%. Haemodynamic group 2 declines from 26 to 14%, group 3 declines from 16 to 12%, group 4 from 6 to 4%, and group 5 from 1.5 to 0.6%. There were no cases, of course, with developed pulmonary vascular disease in the first year of life (group 6), but there is a small percentage, 0.3%, by 7.5 yr and nearly 10% in the adult group. M.M.

**A71-27863 # Structural bases of myocardial hypertrophy.** Hubert Meessen (Düsseldorf, Universität, Düsseldorf, West Germany). (British Cardiac Society and British Heart Foundation, World Congress of Cardiology, 6th, London, England, Sept. 6-12, 1970.) British Heart Journal, vol. 33, Mar. 1971, Supplement, p. 94-99. 34 refs.

Discussion of various forms and mechanisms of myocardial hypertrophy. The thickness of myocardial fibers is considered, together with the quality of the nuclei, and the swelling of the mitochondria following prolonged physical exertion. It is pointed out that full adaptation in the sense of hypertrophy is achieved only if the protein synthesis controlled by the RNA content permits an increase in the number of contractile units in the cells. In man the increase in the volume of cell plasma is accompanied by an increase in the DNA content of the nucleus. M.M.

**A71-27864 # Mechanism of hypertrophy of the heart and experimental prevention of acute cardiac insufficiency.** F. Z. Meerson (Akademiiia Meditsinskikh Nauk SSSR, Moscow, USSR). (British Cardiac Society and British Heart Foundation, World Congress of Cardiology, 6th, London, England, Sept. 6-12, 1970.) British Heart Journal, vol. 33, Mar. 1971, Supplement, p. 100-108. 49 refs.

Analysis of the principal mechanism of development of cardiac hypertrophy and the consequences of the current concept of this mechanism in the prevention of acute cardiac insufficiency in overload of the heart. It is pointed out that the lack of energy arising in intense and protracted hyperfunction of the organs becomes the cause of labilization of lysosomes, and that the breakdown of structures produced by lysosome ferments is the stimulus leading to activation of nucleic acid and protein synthesis in the cells. This activation and the ensuing hypertrophy finally result in decrease in intensity of functioning of structures of the organ and in increase in capacity of the mechanisms ensuring energy transformation. Thus the lack of energy and the increased breakdown of structures are eliminated and the hyperfunction of the hypertrophied organ becomes relatively stable. Two hypotheses as to how the breakdown of structures may activate the genetic cellular apparatus are discussed. M.M.

**A71-27865 # Risks of mild hypertension - A ten-year report.** Oglesby Paul (Passavant Memorial Hospital, Chicago, Ill.). (British Cardiac Society and British Heart Foundation, World Congress of Cardiology, 6th, London, England, Sept. 6-12, 1970.) British Heart Journal, vol. 33, Mar. 1971, Supplement, p. 116-121. 6 refs.

Data relating to the risks of hypertension are presented from six prospective studies of cardiovascular disease initiated in the United States 1948-1958. 6640 men, aged 30 to 59 when first seen, were

followed for 10 years and observations recorded on morbidity from cardiovascular disease and mortality from all causes as well as from cardiovascular disease. Diastolic blood pressures of 85 to 104 mm Hg as recorded on the initial visit have unfavorable implications in terms of total death rate, deaths from coronary disease, major coronary events (nonfatal myocardial infarctions and deaths from coronary disease), and cerebrovascular episodes. The deleterious effect is most conspicuous in men in their fifties, but also appears in the younger age groups. (Author)

**A71-27866 # Hypertension and arterial disease.** J. R. A. Mitchell (Nottingham University, Nottingham, England). (British Cardiac Society and British Heart Foundation, World Congress of Cardiology, 6th, London, England, Sept. 6-12, 1970.) British Heart Journal, vol. 33, Mar. 1971, Supplement, p. 122-126. 21 refs.

There is abundant evidence that the height of an individual's systemic arterial pressure is related, in a graded way, to his chances of developing ischaemic heart disease or cerebrovascular disease. The way in which the link operates in respect of coronary disease is not yet known, and further evidence is required before we can accept that the hypertension is necessarily a direct causal factor rather than a marker of some feature in the individual's make-up which is itself linked to the onset of arterial thrombosis (the 'series' or 'parallel' wiring dilemma). In respect of haemorrhagic stroke not only have we a link but we also have a mechanism of action plus evidence that pressure reduction can modify the risk. We have a 'series' wired circuit, and the problem now facing us is to acquire the wisdom which will allow us to decide when to seek out hypertension and what we should do when we find it. (Author)

**A71-27867 # Acute myocardial infarction - Progress in primary prevention.** Jeremiah Stamler (Northwestern University, Chicago, Ill.). (British Cardiac Society and British Heart Foundation, World Congress of Cardiology, 6th, London, England, Sept. 6-12, 1970.) British Heart Journal, vol. 33, Mar. 1971, Supplement, p. 145-164. 51 refs. Research supported by the American Heart Association, the Chicago Heart Association, CPC International, Inc., and NIH.

Factors involved in the strategy for the control and primary prevention of premature myocardial infarction and coronary heart disease. It is pointed out that all four 'first generation' studies on primary prevention of coronary heart disease have found that changes in living habits, particularly diet, and in one study, cigarette smoking, are associated with decreased incidence or mortality, or both, from myocardial infarction and coronary heart disease. The studies are encouraging and significant in view of their consistency as well as their agreement with expectations in terms of findings from clinical, pathological, animal-experimental, and descriptive epidemiological research. M.M.

**A71-27868 # Automation in cardiology.** Leon Resnekov (Chicago, University, Chicago, Ill.). (British Cardiac Society and British Heart Foundation, World Congress of Cardiology, 6th, London, England, Sept. 6-12, 1970.) British Heart Journal, vol. 33, Mar. 1971, Supplement, p. 194-202. 35 refs. Research supported by the University of Chicago and the Chicago Heart Association.

The basic principles of analog and digital computers are reviewed and their application is described for the beat-to-beat analysis of the electrocardiogram using the AZTEC data reduction programme, for on-line haemodynamic analyses in the cardiac catheterization laboratory, coronary care unit, or postoperative ward, and for the clinical history and physical examination of the patient. The role of the computer in the management of cardiovascular disease is defined and its superiority in the collection and manipulation of complex data is emphasized. Its use in sparing staff the tedium of routine analyses of data will amply repay the initial cost of its installation. (Author)

**A71-27876 # Man in space - Physiology and psychology (Chelovek v kosmose - Fiziologija i psichologija).** V. V. Parin (Akademija Nauk SSSR, Laboratoriia Problem Upravlenija Funktsiami Organizma Cheloveka i Zhivotnykh, USSR), F. P. Kosmolinskii (Vsosoiuznyi Nauchno-Issledovatel'skii Institut Meditsinskogo Priborostroeniia, Moscow, USSR), and I. M. Khazen. *Priroda*, no. 4, 1971, p. 9-17. In Russian.

A review of already solved and still unsolved problems associated with the influence of various spaceflight factors on organisms is presented. Optimum formulation of the gaseous medium in spacecraft and control of its parameters is discussed. Food supply problems during spaceflight missions and, in particular, the feasibility of introduction of closed ecological systems, are examined. Particular attention is given to biomechanical aspects of weightlessness, including the effects of weightlessness on the vestibular system. Psychological stresses arising from a long-term isolation of man in a small closed cabin are also considered. Principal psychological, physiological, and biological problems of major importance which are to be studied in the near future are summarized. O.H.

**A71-27894 # Extraprimary negative component of the visual potential (Ekstrapervichnyi otritsateli'nyi komponent zritel'nogo potentsiala).** F. A. Ata-Muradova (Akademija Meditsinskikh Nauk SSSR, Moscow, USSR) and L. M. Chuppina (Pervyi Moskovskii Meditsinskii Institut, Moscow, USSR). *Akademija Nauk SSSR, Doklady*, vol. 197, Mar. 1, 1971, p. 238-241. 15 refs. In Russian.

Fifty millisecond light pulses from an Alvar lamp positioned 20 cm away from the eye were delivered to the retinas of 15 nembutal-anesthetized rabbits in a study of the extraprimary (briefly latent) negative component of the evoked visual potential of the rabbits. Silver ball electrodes were inserted in the visual cortex and indifferent electrodes were inserted in the nasal bone of the rabbits for potential response recording on an Alvar biphasic oscillator. Strychnine was applied at potential pickup points. The postsynaptic nature of the extraprimary component, its low sensitivity to strychnine, and its relatively high stability to lethal nembutal doses were established. V.Z.

**A71-28012 # Stereophotogrammetry in ophthalmology (Stereofotogrammetrija v oftal'mologii).** L. S. Urmakher. *Geodezija i Aerofotos'emka*, no. 6, 1969, p. 101-108. 5 refs. In Russian.

Summary of recent work accomplished in the theoretical and experimental development of stereophotogrammetric methods and instruments for studying the anatomical-optical apparatus of the eye and certain pathological changes in it. The application of specific methods and instruments to the study of the anterior chamber of the eye, the optical system of the eye, and the eye bottom is considered. Some recently developed stereophotogrammetric devices for use in ophthalmological studies are described, including a special stereophotogrammetric chamber for photographing the anterior chamber of the eye, a stereophotogrammetric ophthalmometer, a stereoscopic ophthalmophote, and a stereoscopic photoophthalmoscope for stereophotogrammetric photographing of the eye bottom and pathological changes in it. A.B.K.

**A71-28029 # Deficit of heat during the cooling of the cerebrum (Defitsit tepla pri okhlazhdennii golovnogo mozga).** V. V. Suvorov and V. P. Novikov (Vladimirskii Pedagogicheskii Institut, Vladimir, USSR). *Bulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 71, Mar. 1971, p. 23-26. 12 refs. In Russian.

Temperature variations in the cerebrum and the insulating and heat conducting properties of tissues were studied in ether-anesthetized dogs whose heads were cooled by a water stream at 2 to 5 deg C. The temperature of the cerebrum, 7, 20 and 30 mm deep, and the rectal body temperature were measured with thermocouples on a potentiometer, and the skin temperature and heat release were measured by sensors. It was found that the hypothermia of the cerebrum decreased the body temperature of the dogs and that the

temperature decrease persisted during the duration of exposure and stimulated the stability of nervous cells. V.Z.

**A71-28038 # Dynamics and principles of saturation of an organism with indifferent gases (Dinamika i printsipy nasashchenija organizma indifferentnymi gazami).** G. L. Zal'tzman, G. A. Chulimov, and K. S. Iurova (Akademija Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR). *Akademija Nauk SSSR, Izvestija, Serija Biologicheskaja*, Mar.-Apr. 1971, p. 192-203. 15 refs. In Russian.

Tolerance to argon, nitrogen, and helium partial pressures was studied in a total of 360 experiments on 6 dogs exposed for periods from 7.5 to 4 hr to gas mixtures containing 0.2 to 0.4 atm of oxygen, and argon, nitrogen, or helium to a total pressure of up to 8 atm. Curves for saturation of the organism with these gases are plotted. An attempt is made to translate these curves to humans. A mathematical model is proposed to describe the concentration of an indifferent gas in liquid and cellular media of an organism as a function of time and diffusion rates. V.Z.

**A71-28149 Selection of the number and positions of measuring locations for electrocardiography.** Roger C. Barr, Madison S. Spach, and G. Scott Herman-Giddens (Duke University, Durham, N.C.). *IEEE Transactions on Bio-Medical Engineering*, vol. BME-18, Mar. 1971, p. 125-138. 31 refs. Research supported by the North Carolina Heart Association and PHS.

Consideration of how many and which locations on the body surface must be measured, by taking ECGs at these positions, to be able to determine consistently the total-body QRS surface-potential distribution as it varies in time. An advantage of using the ability to compute the total-body potential distribution as a criterion of quality is that untestable assumptions about the nature of heart electrical activity are avoided. The approach involves applying principal component analysis followed by a minimum-rms estimation method. It is concluded that if the surface potential distribution is computed from measuring positions approximating the Frank VCG locations or the standard ECG locations, then for some cases accuracy is unacceptably poor. For consistently acceptable accuracy a minimum of 24 properly placed measuring locations is required.

F.R.L.

**A71-28150 Dipole, quadripole, and octapole measurements in isolated beating heart preparations.** Fred H. Terry, Daniel A. Brody, Charles O. Eddlemon, John W. Cox, Jr., Francis W. Keller, and Harry A. Phillips (Tennessee, University, Memphis, Tenn.). *IEEE Transactions on Bio-Medical Engineering*, vol. BME-18, Mar. 1971, p. 139-148. 11 refs. NIH Grants No. HE-01362; No. 5K6-HE-14032; No. HE-09495; No. 5T01-HE-05586.

An experimental technique is described for measuring the equivalent multipole model for isolated beating hearts. The dipole, quadripole, and octapole moments are measured from weighted sums of 20 electrode potentials on the surface of a 6.35-cm diam sphere. An iterative procedure is used to eliminate the effects of source eccentricity for dipolar data. The technique has the dual advantages of emphasizing the multipolar content of the surface potential and allowing simultaneous recording from surface electrodes. The method gives exact replication of eccentric dipoles located up to 2.5 cm from the center of the chamber (radius of 3.175 cm). Physical bipole data are satisfactorily represented by the optimum dipole approximation. Data from two excised beating hearts demonstrate the application of this method to physiological preparations.

(Author)

**A71-28303 Flight crew training - A total concept.** T. J. Layne and P. M. Morton (Boeing Co., Seattle, Wash.). *Society of Automotive Engineers, International Simulation and Training Conference, 4th, Atlanta, Ga., May 13, 1971, Paper 710474.* 31 p. Members, \$1.00; nonmembers, \$1.50.

To serve the requirements of the operational environment of modern jet aircraft, the flight crew training program should be kept as simple as possible and be consistent with the total information system for aircraft operation of which it is a part. Systematic tools are described which assist the course developer in optimizing the implementation of Specific Behavioral Objectives, allocating learning elements to the most cost effective learning environment, and organizing those learning elements associated with the classroom environment. Included is a discussion on the management systems applied, the development of a Learning Task Analysis, and a systems approach to course organization.

(Author)

**A71-28315 Jet aircraft emissions and air quality in the vicinity of the Los Angeles International Airport.** Eloy R. Lozano and Ralph E. George (U.S. Environmental Protection Agency, Los Angeles, Calif.). *Society of Automotive Engineers, National Air Transportation Meeting, Atlanta, Ga., May 10-13, 1971, Paper 710429.* 9 p. 6 refs. Members, \$1.00; nonmembers, \$1.50.

A summary is presented of the results of a comprehensive air pollution study conducted by the Los Angeles County Air Pollution Control District (LACAPCD) under contract with the Air Pollution Control Office of the Environmental Protection Agency. Included in the data obtained are the results of exhaust testing, emission estimates of aircraft and airport ground operations, measurements of the atmosphere in the immediate environs of the airport, and passenger cabin measurements. The data indicate that the CO emissions from airport ground operations exceed levels generally attributed to commercial jet aircraft. Passenger cabin CO measurements during startup and taxiing procedures indicate average levels of 2.7 ppm. Air quality levels in the residential areas around the airport indicate average 6 hr CO concentrations of 3.11 ppm.

(Author)

**A71-28342 What's new on the training horizon.** David O. Andersen and William V. Hagin (USAF, Human Resources Laboratory, Wright-Patterson AFB, Ohio). *Society of Automotive Engineers, National Air Transportation Meeting, Atlanta, Ga., May 10-13, 1971, Paper 710477.* 7 p. 16 refs. Members, \$1.00; nonmembers, \$1.50.

Jet flying training is costly and takes a long time. Flying training has always been essentially a 'learn by do' operation. This paper describes new training technologies. It documents the potential of these technologies, and simple and complex ground trainers for vastly improving both the quality and efficiency of pilot training.

(Author)

**A71-28343 A new approach to flight crew training.** H. H. Shumway (Lockheed-California Co., Burbank, Calif.). *Society of Automotive Engineers, National Air Transportation Meeting, Atlanta, Ga., May 10-13, 1971, Paper 710478.* 10 p. 5 refs. Members, \$1.00; nonmembers, \$1.50.

A flight crew training program was developed for the L-1011 Trijet utilizing a systems approach similar to that used to develop aircraft. This paper describes a ground school program that features automated instruction taught in a 'Cockpit Classroom.' Training material is programmed and presented by an audio visual machine. The emphasis of this approach is 'Learning by Doing.' Training on flight maneuvers will be accomplished in the simulator. A simulator development plan is described to achieve this objective. Flight training is the final examination. Finally, a training plan is presented that indicates that an overlap of ground school and simulator training can increase efficiency. This training plan shows the estimated division of time between ground school, simulator, and flight training for an average trainee.

(Author)

**A71-28344 Airline pilot's view of 747 training.** Charles T. Green (Delta Air Lines, Inc., Atlanta, Ga.). *Society of Automotive Engineers, International Simulation and Training Conference, 4th,*

*Atlanta, Ga., May 13, 1971, Paper 710479.* 4 p. Members, \$1.00; nonmembers, \$1.50.

This paper compares two different types of training used in airline pilot training - the old approach used with early piston aircraft and the first generation of jet aircraft, with a new concept of training introduced with the Boeing 747. The approach to training is called the Specific Behavioral Objective (SBO) concept. This paper is not technical in nature, but presents the views of one airline pilot.

(Author)

**A71-28345 An innovative instrument flight training program.** Paul W. Caro (Human Resources Research Organization). *Society of Automotive Engineers, International Simulation and Training Conference, 4th, Atlanta, Ga., May 13, 1971, Paper 710480.* 10 p. 7 refs. Members, \$1.00; nonmembers, \$1.50.

An innovative flight training program, its development, and initial administration are described. The program involves use of a commercially available training device in a twin-engine transition and instrument training course. Principal features of the training include redefinition of the flight instructor's role, an incentive award system, proficiency-based advancement, full mission training in the device, continuity of training between the device and aircraft, and use of maneuver performance records to control trainee progress. During initial administration of the program by the Army, training flight hour requirements were reduced approximately 40%. The innovative process as it was applied in the development of the described training program also is discussed.

(Author)

**A71-28376 # Reduction of redundant information during analysis of electrocardiograms described by Legendre polynomials (Sokrashchenie izbytochnoi informatsii pri issledovanii elektro-kardiogramm, opisyvaemykh polinomami Lezhandra).** G. I. Makogonenko (Novocherkasskii Politekhnicheskii Institut, Novocherkassk, USSR). *Elektromekhanika*, Mar. 1971, p. 344-346. In Russian.

The equivalent model of a cardiac generator is represented in dipole and quadrupole form, and eight of twelve potentials measured at standard points are expanded into Legendre polynomials. The use of spherical functions significantly reduces the volume of input data for computer processing, while retaining all the useful information contained in the twelve standard electrocardiogram takeoff points. The technical selection of takeoff points for maximum retention of useful information with minimum volume of data is explained, and an illustrative example of the procedure is given.

T.M.

**A71-28377 # Dynamics of slow potential shifts in the subcortical structures of the human brain during mental activity under conditions of willed alteration of the internal medium of the brain (Dinamika medlennykh sdvigov potentsialov v podkorkovykh obrazovaniakh golovnogo mozga cheloveka pri realizatsii psichicheskoi deiatel'nosti v usloviyah napravленного izmenenija vnutrennei sredy mozga).** V. A. Chernysheva (Akademiiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Feb. 1971, p. 150-158. 19 refs. In Russian.

Results of simultaneous recording of slow electrical processes from six to eight pairs of points in the subcortical formations of the human brain during an operative memory test (the Binet test). It is confirmed that the relation between various neuronal-glial assemblies and the activity being performed differs as a function of the functional state of the brain systems maintaining this activity. Willed neuropharmacological action altering the level of active catecholamines, serotonin, and acetylcholine in the brains of patients with disturbances of the metabolism of these biochemical systems leads to the appearance of 'latent' properties of the neuronal assemblies and makes it possible to include some neuronal-glial assemblies in the mental activity being performed and to exclude others. The possibility of performing the given mental activity with the participation of various central mediator systems attests to the considerable compensatory possibilities in the brain systems maintaining the mental activity and to the reliability of their functioning.

A.B.K.

A71-28378 # Spontaneous activity of neuronal assemblies of subcortical structures during sleep and dreaming in man (Spontannaya aktivnost' kletochnykh populiatsii podkorkovykh struktur vo vremia sna i snovidenii u cheloveka). N. I. Moiseeva, Z. A. Aleksanian, and Yu. K. Matveev (Akademiiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Feb. 1971, p. 159-166. 12 refs. In Russian.

Study of the impulse activity of a number of deep structures of the brain during sleep in patients treated by the method of implanted electrodes. The dynamics of the impulse activity of neuronal assemblies was compared with the Loomis electrographic phases of sleep. With deepening sleep a decrease in the impulse activity level was observed in most structures. In the ventrolateral thalamic nucleus the impulse activity level was found to remain the same or to increase in comparison with the activity during wakefulness. During REM sleep a sharp increase in the impulse activity, considerably exceeding the wakefulness level, was observed. In certain structures the frequency of the impulse activity during REM sleep did not exceed the wakefulness level or exceeded it only slightly. The activity level during REM sleep was higher in those cases where this phase was accompanied by dreaming, as revealed during later questioning of the subject. The increase in the impulse activity level of the subcortical structures during wakefulness after a fairly long period of sleep was found to be a 'measurable result' of the sleep process. This increase is to a certain extent proportional to the length of the preceding period of sleep. A.B.K.

A71-28379 # Thresholds of electroencephalographic and behavioral arousal during various phases of sleep (Porogi elektroenzefalograficheskogo i povedencheskogo probuzhdeniya v razlichnykh fazakh sna). T. N. Oniani and P. P. Mol'nar (Akademiiia Nauk Gruzinskoi SSR, Laboratoriia Sravnitel'noi Neirofiziologii, Tiflis, Georgian SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Feb. 1971, p. 167-175. 28 refs. In Russian.

Study of changes in the thresholds of EEG and behavioral arousal caused by electrical stimulation of the mesencephalic reticular formation, the central gray matter, and the red nucleus, and also by unconditioned and conditioned audio stimuli, in cats with chronically implanted electrodes during various phases of sleep. The thresholds of EEG arousal during various phases of sleep were found to be the same for all stimuli, while in the case of the threshold of behavioral arousal an increase was observed in the paradoxical phase of sleep in comparison with the slow-wave phase. The threshold of behavioral arousal during electrical stimulation of the central gray matter during the paradoxical phase was found to be lower than in the slow-wave phase. A.B.K.

A71-28380 # Certain aspects of the neurophysiology of the stages of natural sleep and wakefulness according to the results of spectral and correlation analyses of bioelectric activity (Nekotorye aspekty neirofiziologii stadii estestvennogo sna i bodrstvovaniia po dannym spektral'nogo i korrelatsionnogo analizov bioelektricheskoi aktivnosti). I. G. Karmanova and E. V. Churnosov (Akademiiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Feb. 1971, p. 185-193. 18 refs. In Russian.

Discussion of certain neurophysiological features of the stages of natural sleep and wakefulness in birds on the basis of the results of spectral and correlation analyses of the bioelectric activity of various structures of the hypothalamic and thalamic brain systems in chickens. It is shown that the mechanism of synchronization of low-frequency oscillations (3 to 7 per sec) of bioelectric activity is completely developed in chickens. This mechanism is particularly apparent during the telencephalic stage of sleep due to the dominance of the thalamic integration system during this stage. The paradoxical stage of sleep lasts only a few seconds in chickens, but it has specific features of electrographic representation both in the low-frequency and the high-frequency parts of the spectrum. In the cataleptic stage of sleep a periodic superposition of two electro-

graphic frequency components is noted - namely, a component of regular frequency (8 to 12 per sec) and high-power spindles (4 to 6 per sec). It is assumed that during the cataleptic stage of sleep the generator of the 8 to 12 per sec rhythm is located in the anterior hypothalamus, while the source of the 4 to 6 per sec spindles is located in the thalamus. A.B.K.

A71-28381 # Changes in the postsynaptic potential and impulse activity of the visual cortex cells in response to light stimuli of various intensities (Izmeneniia postsinapticheskogo potentsiala i impul'snoi aktivnosti neuronov zritel'noi kory na svetovye razdrazheniya raznoi intensivnosti). N. F. Podvigina, I. A. Korobova, and T. D. Mukharkina (Akademiiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Feb. 1971, p. 194-201. 13 refs. In Russian.

Evaluation of quasi-intracellular recordings from visual cortex neurons of the cat. It is shown that phasic impulse discharges consisting of several trains of impulses are caused by the development of one to three inhibitory postsynaptic potential (IPSP) waves. The amplitude of the IPSP waves increases with an increase in the stimulus intensity and with an intensification of the dark adaptation of the visual system. The number and maximum frequency of the spikes in the first train of phasic discharges depend linearly on the logarithm of the retina illumination. It is shown that in the course of light adaptation, and also at low rates of movement of the contrast boundary in the field of vision, the inhibitory pauses in the phasic discharges vanish. It is assumed that the number (and the maximum frequency) of the spikes in the first and second trains of phasic discharges is a signal transmitting information about the contrast value on the retina. A.B.K.

A71-28382 # Correlation analysis of the kinematic-dynamic structure of walking in man (Korrelatsionnyi analiz kinemato-dinamicheskoi strukturny khod'by cheloveka). V. S. Lialin and A. P. Matveev (Nauchno-Issledovatel'skii Institut Protezirovaniia, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Feb. 1971, p. 218-222. In Russian.

Determination of the correlation and cross-correlation functions of the interlink angles of the lower extremities of human subjects during walking. A device developed for the approximate calculation of the mean values and variances of the corresponding uncentralized processes is described. The results of measurements obtained in a study of two groups of subjects are found to confirm the advisability of using such integral estimates analyzing locomotor functions in man. A.B.K.

A71-28383 # The nature of the frequency-dependent self-regulatory mechanism of the contraction of myocardium cells (O prirode chastotnozavisimogo samoregulatornogo mehanizma sokrashchenii kletok miokarda). R. S. Orlov, V. Ia. Izakov, and V. M. Shevelev (Meditinskii Institut, Sverdlovsk, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Feb. 1971, p. 223-239. 23 refs. In Russian.

Survey of experimental data concerning the nature of the mechanism controlling the contractile activity of the myocardium. It is shown that direct and inverse relations exist between the parameters of the transmembrane action potential and the frequency and strength of heart contractions. Adaptation of the myocardium strength to various operating frequency regimes occurs as a result of changes in the parameters of the action potentials modulating the characteristics of the contractile act. Potentiation of the contractions is attributed to cumulation and interaction of sodium and calcium ions in specialized portions of the myocardium cells. A mathematical model describing inotropic phenomena in heart cells is proposed. A.B.K.

A71-28384 # Cholinergic activity of human blood during various states of the organism - Nonmediator action of acetylcholine (Kholinergicheskai aktivnost' krovi cheloveka pri razlichnykh

**sostoianiiakh organizma - K voprosu o nemediatornom deistvii atsetilkholina.** G. N. Kassil' and R. A. Sokolinskaya (Akademii Nauk SSSR, Laboratoriia Problem Upravleniiia Funktsiami v Organizme Cheloveka i Zhivotnykh, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Feb. 1971, p. 248-259. 32 refs. In Russian.

Determination of some components of the cholinergic complex in human blood during various physiological states of the organism and during disorders in the activity of the central and vegetative parts of the nervous system. It is shown that inactivation of acetylcholine in the blood is achieved not only by means of enzyme hydrolysis, but also by binding it with erythrocytes. The erythrocytes participate in the realization of a distant (nonmediator) action of acetylcholine, binding and freeing it according to the requirements of cells, tissues, and organs. In various states of the organism the cholinergic (parasympathomimetic, parasympathotropic) activity of the blood is subjected to considerable fluctuations which occur as a result of quantitative shifts in the content of individual components of the cholinergic complex and during changes in the ratio between them.

A.B.K.

**A71-28385 # Use of a small computer for averaging evoked brain potentials in a real time scale during long-distance communication** (Usrednenie vyzvannykh potentsialov mozga v real'nom mashtabre vremeni pri distantsionnoi svazi s maloi ETsVM). N. N. Glushkov, G. V. Abuladze, and Kim Sun (Akademii Nauk SSSR, Institut Matematiki i Institut Fiziologii, Novosibirsk, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Feb. 1971, p. 310-312. In Russian.

Description of a system for averaging evoked brain potentials involving the use of a small computer linked to the experimental arrangement by long-distance communication lines. The proposed system is based on the use of a control computer with a seven-digit bipolar voltage-to-code converter for introducing continuous signals and a code-to-voltage converter for presenting the results of the calculations in the form of continuous signals and representing them in the form of a graph. Oscillograms of the superposition of actual signals transmitted from the experimental arrangement to the computer are compared with an averaged realization.

A.B.K.

**A71-28392 # Sunlight and night vision.** B. A. J. Clark (Australian Defence Scientific Service, Melbourne, Australia). *British Astronomical Association, Journal*, vol. 81, Apr. 1971, p. 208-210. 12 refs.

Relevant research of the effect of excessive exposure to sunlight on night vision is summarized. It is shown that the exposure affects rods and cones of the retina and thus delays the onset of dark adaptation of the eye; excessive exposure can result in losses in visual sensitivity, acuity, and contrast discrimination. On the other hand, complete restriction from sunlight for long periods does not improve visual sensitivity. Persons engaged in astronomical observations should therefore wear dense sunglasses when outdoors in sunlight.

O.H.

**A71-28401 # Infection resistance and immunobiological reactivity of the organism during hypoxic hypoxia** (Antiinfektsionnaia rezistentnost' i immunobiologicheskaiia reaktivnost' organizma pri gipoksicheskoi gipoksi). A. S. Kaplanskii. *Kosmicheskaiia Biologija i Meditsina*, vol. 5, Jan.-Feb. 1971, p. 3-9. 52 refs. In Russian.

Soviet and foreign papers concerning the effects of hypoxia on the resistance and immunity of animals and man to infections are reviewed. The infections covered include pneumonia, Clostridium welchii, endocarditis, Tripanosoma lewisi, Plasmodium cathemerium, Klebsiella pneumonia, influenza virus, ectromelia virus, and salmonellosis. The reviewed data indicate that cases of bacterial and protozoa infections are aggravated and virus infections are alleviated by hypoxia. The conflicting results of studies of the immunological activity of the organism under hypoxia are noted.

V.Z.

**A71-28402 # Effects of inert gases on animal organisms exposed to high CO<sub>2</sub> concentrations and different ambient temperatures** (O vliianii inertnykh gazov na organizm zhivotnykh v usloviakh vysokikh kontsentratsii CO<sub>2</sub> i razlichnykh okruzhayushchikh temperatur). M. M. Osipova and A. G. Dianov. *Kosmicheskaiia Biologija i Meditsina*, vol. 5, Jan.-Feb. 1971, p. 10-15. 11 refs. In Russian.

The effect of helium-for-nitrogen substitution in air containing 10% CO<sub>2</sub> on the body temperature, heart beat and respiration rates and tolerance was studied in a total of 225 sealed-chamber experiments on albino rats exposed for 1 hr to temperatures of 22, 27, 31, 36, or 40°C. The body temperature of experimental rats was appreciably lower than that of control rats when the ambient temperature was between 22 and 36°C, while at 40°C the thermal balance of the animals was not appreciably affected. Similar experiments with argon-for-nitrogen substitution showed no appreciable effects at all test temperatures.

V.Z.

**A71-28403 # Changes in the water-salt metabolism of humans under conditions of immersion in water** (Izmeneniiia vodno-solevogo obmena cheloveka, nakhodiashchegosia v usloviakh vodnoi immersii). L. A. Ioffe, A. V. Korobkov, L. A. Lantsberg, and E. I. Fel'shina. *Kosmicheskaiia Biologija i Meditsina*, vol. 5, Jan.-Feb. 1971, p. 15-19. 18 refs. In Russian.

A group of 5 healthy young male subjects were kept for 5 days immersed neck-deep at about 34°C in water containing 9 gr/liter NaCl. Daily diuresis, Ca, K, Na and creatinine excretion in urine, and daily calory and water intake were recorded for the subjects 2 days before, during, and 3 days after the experiment. K and Na in blood plasma, Ca in blood serum, K, Na and water contents in erythrocytes, and the hematocrit index were also determined. The contents of Na and K in blood plasma and of erythrocytes in the blood, and the hematocrit index were higher during immersion.

V.Z.

**A71-28404 # Effect of ionized air on the acetylcholine content and choline esterase activity in mice of different strains** (Vliyanie ionizirovannogo vozdukh na soderzhanie atsetilkholina i aktivnost' kholinesterazy u myshei razlichnykh liniii). B. V. Anisimov and S. P. Novikova. *Kosmicheskaiia Biologija i Meditsina*, vol. 5, Jan.-Feb. 1971, p. 19-22. 10 refs. In Russian.

400 mice of three different strains were exposed for 24 hr to ionized air containing positive or negative ions. The acetylcholine content in intestinal tissues was lower and the choline esterase activity in blood plasma was higher in experimental mice than in control mice. These changes were greater after exposure to positively ionized air. This physiological effect of air ions is linked to their effect on the interaction between the cholinergic and serotonergic systems of mice.

V.Z.

**A71-28405 # Cultivation of cereals as a possible component of the autotrophic unit of a life support system** (Kul'tura khlebnykh zlakov kak vozmozhnyi komponent avtrotrofного zvena sistem zhizneobespecheniya). G. M. Lisovskii and M. P. Shilenko. *Kosmicheskaiia Biologija i Meditsina*, vol. 5, Jan.-Feb. 1971, p. 22-25. 11 refs. In Russian.

Experiments in a phytotron under intensive illumination produced in four spring wheat strains a substantially higher photosynthetic activity with markedly higher dry mass and grain yields than in field conditions of lower illumination. It is hence suggested that cereals be considered as possible components of biological cycles in life support systems.

V.Z.

**A71-28406 # Analysis of oxygen output in plant conveyers with steps of different durations** (Analiz kislorodnoi produktivnosti rastitel'nykh konveierov pri razlichnoi velichine shaga). E. V. Lebedeva, L. V. Dmitrieva, and E. N. Akanov. *Kosmicheskaiia Biologija i Meditsina*, vol. 5, Jan.-Feb. 1971, p. 25-29. In Russian.

## A71-28407

The optimization of time intervals between successive harvestings (conveyer steps) and the most favorable age of harvested plants are discussed as approaches to enhancing the efficiency of sectioned oxygen-producing plant systems. Typical examples of calculations are given for oxygen output fluctuations vs the length of time intervals between successive harvestings and for oxygen yield from total planted area vs the age of harvested plants. Respective formulas are given.

V.Z.

**A71-28407 # Determination of lipids, proteins, and carbohydrates in Chlorella biomass by pyrolysis and gas chromatography (Oprudelenie lipidov, belkov i uglevodov v biomasse Khlorella s pomoshch'iu piroliza i gazovoi khromatografii).** Iu. V. Pepeliaev and A. P. Tereshchenko. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, Jan.-Feb. 1971, p. 29-33. 5 refs. In Russian.

A Shimadzu chromatograph with a flame-ionization detector was used for express determinations of lipid, protein, and carbohydrate contents in Chlorella biomass by aluminogel column chromatography of the gaseous products of a 15-sec pyrolysis of biomass samples at 450 C. A procedure is described for calculating the contents of these compounds in samples by an analysis of lipid carbon, protein carbon, and carbohydrate carbon peaks on the pyrochromatograms. The mean square error of a determination by this fast technique is estimated to be 7.7%. V.Z.

**A71-28408 # Effect of rare metal hydroxides on the reaction of formaldehyde condensation into sugars (Vliyanie gidrookisoi redkozemel'nykh metallov na reaktsiiu kondensatsii formal'degida v sakharu).** A. A. Berlin, O. V. Krylov, and Iu. E. Siniak. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, Jan.-Feb. 1971, p. 33-36. 6 refs. In Russian.

The effectiveness of lanthanide hydroxides as catalysts in conversion of formaldehyde to carbohydrates and the possible usefulness of this process in life support systems are investigated. It is demonstrated that formaldehyde can be converted to pentoses and hexoses at 110 C when Tm, Dy, Er, Eu, Sm, Ce, Gd, Sc, Ho, La, and Y hydroxides are used as the catalysts.

V.Z.

**A71-28409 # Metabolism and renal function of the crew-members of the Soiuz 6, Soiuz 7, and Soiuz 8 spacecraft after flight (Obmen veshchestv i funktsii pochek u chlenov ekipazhei kosmicheskikh korablei 'Soiuz-6,' 'Soiuz-7' i 'Soiuz-8' posle poleta).** I. S. Balakhovskii, A. I. Grigor'ev, I. G. Dlusskaia, G. I. Kozyrevskaia, V. I. Legen'kov, Iu. V. Natochin, A. K. Sgibnev, E. I. Shakhmatova, and T. A. Orlova. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, Jan.-Feb. 1971, p. 37-44. 11 refs. In Russian.

Sugar, urea, cholesterine, and lipid phosphorus were determined in 10 ml samples of blood from the seven crewmembers of these spacecraft. Total N, creatinine, 17-oxy corticosteroids, inorganic phosphorus, chlorine, sodium, potassium, calcium, magnesium, and vanillyl-amydgalic acid were also determined in daily urine specimens. It is concluded that the loss of weight during the flight was largely due to water and salt discharges. The ability of the kidneys to perform a fast discharge of the water drunk by the crewmembers was depressed after the flight. The contents of cholesterine, lipid phosphorus, and sugar in the blood remained unchanged after the flight.

V.Z.

**A71-28410 # Daily physiological-function and efficiency periodics of man under conditions of a frequent alternation of sleep and wakefulness periods (Sutochnaia periodika fiziologicheskikh funktsii i rabotospособnosti cheloveka pri rezhime s chastoi smenoj perioda sna i bodrstvovaniia).** A. N. Litsov. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, Jan.-Feb. 1971, p. 44-52. 12 refs. In Russian.

Heart beat and respiration rates, body temperature, EEG, simple and complex motor reactions, higher nervous system performance, and self-service performance were investigated over periods from 8 to

11 days in surdochamber experiments on a group of 15 healthy subjects whose daily routine included 3 hr of sleep alternating with 3 to 7 hr periods of wakefulness. The various factors promoting and obstructing the adaptation of subjects to these sleep-wakefulness shifts are discussed. A tentative conclusion is made that extreme deviations from normal daily wakefulness timetables should be brief so as not to affect strongly the physiological functions and working capacity of man.

V.Z.

**A71-28411 # Creation of an optimal 'color climate' in spacecraft cabins (K sozdaniu optimal'nogo 'svetovogo klimata' v kabinakh letatel'nykh apparatov).** G. I. Gurvich and E. P. Kozhevnikov. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, Jan.-Feb. 1971, p. 53-57. 10 refs. In Russian.

Study of the higher nervous activity of rats, monkeys, and humans during their adaptation to monochromatic red, yellow, green, and blue light. The data obtained from this study are used in investigations of the psychophysiological equivalents of individual regions of the visible light range. The specific reactions to colors observed in the experiments are discussed in relation to their use in space cabin interiors.

A.B.K.

**A71-28412 # Study of the composition of air exhaled by humans exposed to certain stress effects (Issledovanie sostava vydykhaemogo chelovekom vozdukh pri deistvii nekotorykh ekstremal'nykh faktorov).** N. L. Sokolov, Iu. G. Nefedov, V. P. Savina, and V. E. Ryzhkova. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, Jan.-Feb. 1971, p. 57-60. In Russian.

Results of qualitative and quantitative studies of the gaseous microimpurities contained in air exhaled by humans subjected to certain stress factors (20-day bed rest, 20-day starvation, 120-day feeding with lyophilized diets, high temperature and humidity). Using the methods of colorimetry, nephelometry, and gas chromatography, it is found that the most significant changes detected in exhaled air occur during exposure to prolonged starvation and high temperature (40 C).

A.B.K.

**A71-28413 # Effect of adequate vestibular stimuli on the external respiration function and neuron activity of the respiration center (Vliyanie adekvatnykh vestibuliarnykh razdrashenii na funktsiiu vneshnego dykhaniia i aktivnost' neironov dykhatel'nogo tsentra).** M. D. Emelianov and L. A. Radkevich. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, Jan.-Feb. 1971, p. 60-65. 15 refs. In Russian.

Study of the effect of vestibulovegetative reflexes on the respiration system of humans and animals. The state of external respiration of human subjects exposed to accelerations ranging from 33 to 1200 deg/sec/sec producing vestibular stimulation is investigated. Correlations between the vestibular analyzer and external respiration (as evidenced by respiration inhibition during labyrinth stimulation) are established. The functional state of respiration neurons of the oblongata of animals (cats) exposed to swinging is studied. It is shown that the impulse activity of the neurons increases, inspiratory acts shorten, and expiratory acts lengthen. By means of autocorrelation analysis it is found that spike intervals regularly vary in conformity with the swinging periods. Changes in the functional state of the respiration center due to lobeline administration or vagus nerve severing are found to affect the responses of respiration neurons during animal swinging.

A.B.K.

**A71-28414 # The problem of estimating vestibular stability (K voprosu ob otsenke vestibuliarnoi ustoychivosti).** R. R. Galle, B. V. Ustiushin, L. N. Gavrilova, and E. I. Khelemskii. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, Jan.-Feb. 1971, p. 65-71. 22 refs. In Russian.

Analysis of the somatic and autonomic components of the vestibular responses of test subjects examined using the Coriolis acceleration test. An approach to the assessment of human tolerance to vestibular stimulation is presented. In accordance with this

approach, the test subjects can be classified as tolerant and intolerant to vestibular stimuli. Vestibular intolerance is suggested by the development of vestibulo-autonomic reactions of the third degree. With respect to the time of appearance and the level of manifestation of the responses, it is suggested that three degrees of vestibular tolerance and three degrees of vestibular intolerance be distinguished, each of which can be characterized by certain clinical and physiological reactions.

A.B.K.

**A71-28415 # Analysis of forces acting on the receptor formations of the semicircular canals during movements of man in rotating systems (Analiz sil, deistvuiushchikh na retseptornye obrazovaniia polukruznykh kanalov pri peremeshcheniiakh cheloveka vo vrasciaushchikhsia sistemakh).** I. Yu. Sarkisov. *Kosmicheskaiia Biologija i Meditsina*, vol. 5, Jan.-Feb. 1971, p. 71-76. 14 refs. In Russian.

Use of vector analysis to estimate the accelerations influencing the receptors in the semicircular canals during the movements of a man in a rotating environment. It is shown that during longitudinal displacements of a man in a rotating system only tangential accelerations caused by the angular acceleration of the rotating system and by the angular acceleration of the man's head, as well as Coriolis accelerations caused by the rotation of the man's head or by passive rotation of the man about an axis in the moving system, lead to a displacement of the cupula from the equilibrium state, thus inducing impulsion changes in the ampular nerve of the semicircular canal.

A.B.K.

**A71-28416 # A method of studying the sensomotor activity of an operator perceiving stimuli in a broad visual field (Metodika issledovaniia sensomotornoi deiatel'nosti operatora pri vospriyatiili razdrazhiteli v shirokom zritel'nom pole).** K. K. Ioseliani. *Kosmicheskaiia Biologija i Meditsina*, vol. 5, Jan.-Feb. 1971, p. 76-81. In Russian.

Description of a procedure which may be regarded as a model of the complex sensomotor activity of an aircraft or spacecraft pilot. In the proposed procedure the test subject is required to perform an experimental task at a very high speed. The subject is required to pass from one stimulus to another, to take their specific features into account, bearing in mind the overall result of the preceding activity, to change the result upon presentation of each new stimulus, and to record the final result by pressing the appropriate key of a ten-key integrating machine. The procedure is recommended as a method of psychological selection of aircraft and spacecraft pilots.

A.B.K.

**A71-28417 # Change in the tissue resistance in animals during prolonged restriction of motor activity (Ob izmenenii rezistentnosti tkanei zhivotnykh pri dlitel'nom ogranicenii dvigatelej-noi aktivnosti).** L. V. Serova. *Kosmicheskaiia Biologija i Meditsina*, vol. 5, Jan.-Feb. 1971, p. 82, 83. 10 refs. In Russian.

After 30 days of hypokinesia, the diaphragmatic muscle tissue of rats showed 27% higher sorption of a basic, vital, neutral-red stain than that in control animals. This indicates reduced resistance of the tissue since it is inversely proportional to the sorption level. After 45 days, the sorption level was twice as high as in the control animals. The difference between the two groups dropped to 67% after 60 days, indicating a normalization of the tissue resistance. Thus, the reduction in the organism's overall stability during prolonged hypokinesia is associated not only with physiological changes in the operation of reactive systems, but also involves a change in tissue resistance.

T.M.

**A71-28418 # Influence of oxygen insufficiency on the erythrocytic system of splenectomized dogs (Vliianie kislorodnoi nedostatochnosti na eritroцитarnuiu sistemu splenektomirovannykh sobak).** L. S. Gorozhanin. *Kosmicheskaiia Biologija i Meditsina*, vol. 5, Jan.-Feb. 1971, p. 83-85. In Russian.

Eleven splenectomized dogs in three age groups were subjected at different times after the operation to single and repeated

reductions (56 mm Hg) of partial oxygen pressure in the inhaled air. The blood was analyzed for hemoglobin, erythrocytes, and reticulocytes. The bone marrow and the functional state of erythropoiesis were also analyzed. The results confirm the important role of the spleen as a depot of erythrocytes in reaction to acute hypoxia and demonstrate the participation of this organ in acute reticulocytic reaction.

T.M.

**A71-28433 The amount of H(+) released on ISO-pH oxygenation of human whole blood.** Wanda Arczynska and D. R. Held (Fribourg, Université, Fribourg, Switzerland). *Respiration Physiology*, vol. 12, Apr. 1971, p. 7-16. 19 refs. Swiss National Fund for Scientific Research Grant No. 3.181.69.

Results obtained experimentally at constant CO<sub>2</sub> partial pressure by alkaline titration are presented. In the CO<sub>2</sub> partial pressure range from 30 to 60 mm Hg, the amount of released H(+) was found to be 0.35 meq/mM - i.e., 20 per cent less than suggested previously by others on the basis of a CO<sub>2</sub>-titration method. This discrepancy can be accounted for qualitatively by the presence of the carbamino system. Some of the factors which complicate a comparison of the effects of oxygenation on whole blood and on hemoglobin solutions are discussed.

O.H.

**A71-28434 On the interpretation of the -delta(HCO<sub>3</sub>)/delta pH ratio in respiratory acid-base disturbances.** C. A. Steiner and D. R. Held (Fribourg, Université, Fribourg, Switzerland). *Respiration Physiology*, vol. 12, Apr. 1971, p. 17-24. 13 refs. Swiss National Fund for Scientific Research Grant No. 3.181.69.

Model calculations show that the bicarbonate ion vs pH pathway followed by a buffered solution on carbon dioxide titration deviates markedly from the pathway predicted by its buffer value when the carbon dioxide partial pressure change is combined with the addition or removal of even minor quantities of solvent. It is suggested that small and possibly undetectable water shifts between extracellular space and tissues might contribute significantly to determine the quantitative index for the buffering observed in true plasma or extracellular fluid in response to in vivo respiratory acid-base disturbances.

O.H.

**A71-28435 Differences between alveolar and arterial P sub CO<sub>2</sub> during rebreathing experiments in resting human subjects.** G. Laszlo, T. J. H. Clark, Helen Pope, and E. J. M. Campbell (London, Royal Postgraduate Medical School, London, England). *Respiration Physiology*, vol. 12, Apr. 1971, p. 36-52. 29 refs.

Experiments in which subjects at rest rebreathed from a small bag of CO<sub>2</sub> in oxygen for periods of three minutes revealed that arterial CO<sub>2</sub> partial pressure was lower than end-tidal by about 3 mm Hg in the range from 45 to 60 mm Hg in spite of the virtual abolition of CO<sub>2</sub> exchange. During control periods of breathing air the mean arterial CO<sub>2</sub> partial pressure was 1.5 mm Hg above end-tidal. After 10 minutes of hypercapnia the mean difference between end-tidal and arterial CO<sub>2</sub> partial pressure was zero. In individual subjects the magnitude of the alveolar-arterial CO<sub>2</sub> partial pressure difference during the rebreathing period was related to the amount by which arterial hydrogen ion concentration during rebreathing differed from the value found after 10 minutes of hypercapnia at the same CO<sub>2</sub> partial pressure. The positive end-tidal to arterial CO<sub>2</sub> partial pressure difference indicates that alveolar gas and pulmonary capillary blood do not reach complete equilibrium during rebreathing, but they appear to do so during the normal excretion of CO<sub>2</sub> in the steady state at normal and at high levels of arterial CO<sub>2</sub> partial pressure. A hypothesis is proposed to account for these findings.

O.H.

**A71-28436 Respiratory responses to static muscular work.** K. Myhre and K. Lange Andersen. *Respiration Physiology*, vol. 12, Apr. 1971, p. 77-89. 31 refs.

Investigation of the respiratory responses to sustained hand-grip

## A71-28437

contraction at four tension levels, graded in per cent of maximal voluntary contraction (MVC). An increased ventilation was always observed prior to the work and is explained as an element in the alarm-defense reaction. The typical response pattern during and after work was a steady increase during contractions above the 20% MVC level. The ventilatory peak was observed at the end of the work; then a gradual return to resting level took place during the recovery period. A hyperventilation took place at tensions above the 20% MVC level. The chemical environment of the contracted muscles was altered, as is evident from the finding of lowered venous pH and O<sub>2</sub> partial pressure, and elevated CO<sub>2</sub> partial pressure and lactate concentration. The level of blood gases in arterial blood remained unchanged, and a nervous reflex mechanism (in addition to cortical influence) is proposed as an explanation of the hyperventilation.

(Author)

**A71-28437 Topography of pleural surface pressure during simulation of gravity effect on abdomen.** Emilio Agostoni and Edgardo D'Angelo (Ferrara, Università, Ferrara, Italy). *Respiration Physiology*, vol. 12, Apr. 1971, p. 102-109. 14 refs. Research supported by the Consiglio Nazionale delle Ricerche.

Experiments were carried out in supine rabbits and dogs which show that when the abdominal pressure was decreased until the lung volume equalled that in the head-up posture, a crano-caudal gradient of transpulmonary pressure similar to that in the head-up posture was produced. By further lowering the abdominal pressure, the gradient became greater than in the head-up posture. When the abdominal pressure in head-down rabbits was decreased until the lung volume equalled that in the head-up posture, the vertical gradient of transpulmonary pressure reversed and became nearly equal to that in the head-up posture. When the abdominal pressure in head-up rabbits was increased until the lung volume equalled that in the head-down posture, the vertical gradient disappeared: it reversed only in exsanguinated rabbits. It is concluded that, except when the lung is engorged with blood, the distribution of transpulmonary pressure depends essentially upon the shape of the chest wall, which is mainly related to the gravity effect on its parts. O.H.

**A71-28455 Visual pigments of the vitamin A-deficient, thyroidectomized rat following vitamin A sub 2 administration.** Jerome T. Pearlman and Frederick Crescitelli (California, University, Los Angeles, Calif.). *Vision Research*, vol. 11, Mar. 1971, p. 177-187. 22 refs. NIH Grants No. B-1509; No. EY00-331.

Thyroidectomized, vitamin A-deficient rats suffered a loss of visual sensitivity, as determined by the electroretinographic b-wave and a loss of rhodopsin detected by extraction. The results were similar to those obtained with rats having intact thyroid glands. These visual deficiencies were repaired by giving crystalline vitamin A2 (3-dehydroretinol). In both thyroidectomized and normal animals, the visual pigment was restored. It is concluded that no general role has yet been established for the thyroid in the conversion of visual pigments. M.V.E.

**A71-28456 Properties of the epiphysis cerebri of the small-spotted dogfish shark, *Scyliorhinus caniculus* L. D. I. Hamasaki and Peter Streck (William G. Kerckhoff-Herzforschungsinstitut, Bad Nauheim, West Germany). *Vision Research*, vol. 11, Mar. 1971, p. 189-198. 26 refs. NIH Grant No. 5K3 NB14692.**

A light stimulus focused on the head of a dogfish shark over the terminal vesicle of epiphysis cerebri (pineal organ) elicits a positive slow wave accompanied by a discrete-activity inhibition. The wave was recorded at the abscised end of the epiphysial stalk. The spectral sensitivity at the epiphysis and the lateral eyes culminates at 500 nm. M.V.E.

**A71-28457 Behavioral assessment of absolute visual thresholds in the albino rat.** P. B. Rosenberger and J. T. Ernest (U.S. Army, Walter Reed Army Institute of Research, Washington, D.C.).

*Vision Research*, vol. 11, Mar. 1971, p. 199-207. 16 refs.

Thresholds were measured at different wavelengths of the visible spectrum in albino rats conditioned to change a trained performance in response to a light stimulus. A spectral sensitivity curve representing the measurement results is compared with the in vitro absorption spectrum of rhodopsin. M.V.E.

**A71-28458 Receptive field organization of cat optic nerve fibers with special reference to conduction velocity.** Yoshiro Fukada (NHK Broadcasting Science Research Laboratories, Tokyo, Japan). *Vision Research*, vol. 11, Mar. 1971, p. 209-226. 20 refs.

Receptive fields of single optic nerve fibers in the cat have been subdivided into two types. Type I responds briskly to the abrupt change in the luminance of both a spot and diffuse light, but does not continue to respond to a stationary light stimulus. Type II responds very weakly to diffuse light, but continues to respond to a stationary spot stimulus. The conduction velocity of Type I optic-tract fibers is faster, on the average, than that of Type II fibers. The results of the study suggest that the functional organization of retinal receptive fields is related to the size of ganglion cells. M.V.E.

**A71-28459 The relationship between response characteristics to flicker stimulation and receptive field organization in the cat's optic nerve fibers.** Yoshiro Fukada and Hide-Aki Saito (NHK Broadcasting Science Research Laboratories, Tokyo, Japan). *Vision Research*, vol. 11, Mar. 1971, p. 227-240. 23 refs.

The response characteristics of the cat's Type-I and Type-II optic nerve fibers to flicker stimulation were investigated. As the flicker frequency increases, the average impulse frequency in Type-I fibers increases whereas in Type-II fibers it remains almost unchanged over a wide range of flicker frequencies. It is concluded that Type I is suitable for processing temporal information, while Type II is suitable for processing spatial information. M.V.E.

**A71-28460 A new type of lateral interaction in the human visual system.** V. E. Shchadrin and M. M. Bongard (Akademija Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR). *Vision Research*, vol. 11, Mar. 1971, p. 241-249.

Description of a phenomenon of the human visual system related to spatial interaction: if a dim chromatic test field is viewed eccentrically and a considerably brighter surround is briefly added, the apparent luminance of the test momentarily increases to approximate that of the surround. The phenomenon can be seen dichoptically. M.V.E.

**A71-28461 Detection of grating patterns containing two spatial frequencies - A comparison of single-channel and multiple-channels models.** Norma Graham and Jacob Nachmias (Pennsylvania, University, Philadelphia, Pa.). *Vision Research*, vol. 11, Mar. 1971, p. 251-259. 8 refs. NIH Grant No. EY-00302.

Contrast thresholds were measured for gratings containing two superimposed sinusoidal components. The frequency of one component was always three times that of the other, but the phase between components and the ratio of their contrasts took on several values. The results obtained support the multiple-channels and reject the single-channel model. M.V.E.

**A71-28462 Effect of eye movements on the contrast sensitivity of spatio-temporal patterns.** J. J. Kulikowski (Polska Akademia Nauk, Instytut Automatyki, Warsaw, Poland). *Vision Research*, vol. 11, Mar. 1971, p. 261-273. 30 refs.

Contrast sensitivity was investigated in the presence of exaggerated eye motion and also with stabilized retinal images. The results indicate that exaggerated eye movements reduce the contrast sensitivity for patterns of either low spatial or low temporal frequencies, and increase the sensitivity at high spatial and high temporal frequencies. M.V.E.

**A71-28463** Afterimage and pupillary activity following strong light exposure. David A. Newsome (National Institutes of Health, Bethesda, Md.). *Vision Research*, vol. 11, Mar. 1971, p. 275-288. 12 refs.

Pupillary activity in darkness following exposure to strong bright light was recorded and found to occur in distinct phases. Both pupillary and visual phenomena were found to depend on the intensity and duration of the adapting stimulus light. Some possible mechanisms for these phenomena are discussed. The results obtained confirm Alpern and Campbell's (1963) findings. M.V.E.

**A71-28464** Geometrical illusions and figural after-effects - The mechanism and its location. Gerald H. Fisher (Newcastle-upon-Tyne, University, Newcastle-upon-Tyne, England). *Vision Research*, vol. 11, Mar. 1971, p. 289-309. 37 refs. Research supported by the Medical Research Council.

Previous experimental studies of figural aftereffect phenomena are discussed. A schematic analysis of projections of I and T figures shows that they are represented topographically upon the cortex in essentially similar ways. It is concluded that the mechanism concerned is located in subcortical regions, probably within the retina itself. M.V.E.

**A71-28486 #** Development trends regarding the piloting of an aircraft and their effects on the training of aircraft personnel (*Entwicklungstendenzen in der Luftfahrzeugführung und ihre Auswirkungen auf die Ausbildung von Luftfahrtpersonal*). Fritz Seidler. *Technisch-ökonomische Informationen der zivilen Luftfahrt*, vol. 7, no. 3, 1971, p. 113-124. 7 refs. In German.

New developments concerning aircraft for commercial aviation are examined giving attention to V/STOL and supersonic aircraft. Aspects of aircraft profitability are considered. The performance of man and machine as information-processing systems for purposes of aircraft control and navigation are compared, and the development stages of aeronautical navigation are described. It is concluded that the pilot of today and tomorrow, who is in charge of a very complex technical apparatus, requires a good fundamental education as a basis for the specialized knowledge necessary in specific cases. G.R.

**A71-28487 #** The problems in maintaining the flying personnel in a good state of health (*Die Problematik der Gesunderhaltung des fliegenden Personals*). Gerhard Friess. *Technisch-ökonomische Informationen der zivilen Luftfahrt*, vol. 7, no. 3, 1971, p. 125-127. In German.

The various functions of medical services charged with ensuring the fitness of the flying personnel are examined including the first aptitude evaluation regarding the prospective pilot, the checkups conducted at regular intervals and the constant supervision concerning the degree of stress to which the pilot is subjected. Attention has to be given to the proceeding aging process. The aging process is compensated to a certain extent by increasing professional experience. Approaches for keeping the stress to which pilots are subjected within tolerable limits are considered. G.R.

**A71-28488 #** The significance of functional diagnostics in aerospace medicine (*Die Bedeutung der Funktionsdiagnostik in der Luftfahrtmedizin*). Güntner Fiedler. *Technisch-ökonomische Informationen der zivilen Luftfahrt*, vol. 7, no. 3, 1971, p. 128-132. In German.

It is pointed out that most accidents involving aircraft are related to a failure on the part of the pilot to come up with the correct response required by a given situation. The method of functional diagnostics makes it possible to evaluate the ability of a pilot to perform the required operations. General functional diagnostics provides information regarding the general performance potential of the human organism, while special functional diagnostics investigates stresses which are specific for a particular type of work, i.e., for an aircraft pilot. The effect of various factors can be investigated separately or combined with other factors. G.R.

**A71-28491 #** Contributions to socialist leadership. I - Basic aspects of socialist leadership as part of socialist management (Beiträge zur sozialistischen Menschenführung. I - Grundaspekte der sozialistischen Menschenführung als Bestandteil der sozialistischen Leitungstätigkeit). Karl Bahr. *Technisch-ökonomische Informationen der zivilen Luftfahrt*, vol. 7, no. 3, 1971, p. 149-157. 10 refs. In German.

The position of man in the socialist productive system is discussed. Some general pedagogical aspects of socialist leadership are examined giving attention to the functions of education. These functions involve the assimilation of knowledge and the acquisition of skills. A number of general psychological aspects are considered taking into account the relation of man to his environment, which determines his reaction to an external stimulus. G.R.

**A71-28506** Relation between the appearance of the lesion current on the ECG in anoxia and the collapse of the phosphorylcreatine content of the myocardium (Relation entre l'apparition du courant de lésion sur l'E.C.G. en anoxie et l'effondrement de la teneur du myocarde en phosphorylcreatine). Paul Borredon (Centre d'Enseignement et de Recherches de Médecine Aéronautique, Paris, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 10, 1st Quarter, 1971, p. 7-17. 63 refs. In French.

Attempt to define in a biochemical way certain manifestations of myocardic anoxia which are uniquely described by electrocardiographic criteria. A study was made of the phosphorylcreatine (PC) content of the myocardium in guinea pigs subjected to anoxic anoxia. The animals were ventilated by ambient air and pure nitrogen. It was found that for the same animal there exists, during the first 45 sec of the anoxic test, a parallel between the evolution of the ECG and the evolution of the PC rate. F.R.L.

**A71-28507** Concerning near and intermediate vision among civilian aircrew (A propos de la vision de près et de la vision intermédiaire chez les navigants civils). J. Chevaleraud and P. Bouvery (Ministère des Armées, Hôpitaux des Armées, Paris, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 10, 1st Quarter, 1971, p. 22-24. In French.

Study of the vision of 182 civilian aircrews (pilots, navigators or radio operators, and engineers) over 40 years old, using data obtained in the course of their medical examinations. A certain amount of dissatisfaction with their correcting lenses was noted among the subjects, as well as the fact that some of them did not wear them in flight. It is suggested that since intermediate vision especially on landing and takeoff is of major importance, aircrew should use trifocal spectacles, thus also correcting for near and distant vision. Alternatively, a lens of progressively increasing power could be prescribed. F.R.L.

**A71-28508** Determination of the zone of thermal neutrality in water (Détermination de la zone de neutralité thermique dans l'eau). C. Boutelier, J. Colin, and J. Timbal (Ministère des Armées, Service de Santé des Armées, Paris, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 10, 1st Quarter, 1971, p. 25-29. 9 refs. In French.

Study of heat exchange between the human body and water, in order to determine the zone of thermal neutrality. Knowledge of this zone and the laws of reduction of body temperature as a function of ambient temperature and metabolism make it possible to determine limits of tolerance in cold water and to devise protective equipment. Many experiments are reported which were carried out on nude subjects almost totally immersed in rough water. F.R.L.

**A71-28509** Statistical data on fitness downgrading among operating aircrew of an airline company (Données statistiques sur les dérogations d'aptitude dans le personnel navigant technique d'une compagnie aérienne). J. Lavernhe and E. Lafontaine (Compagnie Nationale Air France, Paris, France). *Revue de Médecine Aéro-*

## A71-28510

*nautique et Spatiale*, vol. 10, 1st Quarter, 1971, p. 30-33. In French.  
Study of fitness downgrading of aircrew in accordance with ICAO or French standards, the latter being sometimes the more rigorous. Navigators and radio operators often acquire hearing deficiencies, especially in the high frequency range. Visual problems are involved in about 25% of cases of downgrading. Other causes are cardiovascular or EEG anomalies, or digestive or pulmonary disturbances.

F.R.L.

**A71-28510** Concerning three ejections by the same pilot (A propos d'une éjection triple chez un même pilote). H. Salvagniac (CPENPMN, Paris, France), R. Auffret, R. P. Delahaye (Ministère des Armées, Service de Santé des Armées, Paris, France), and H. Seris. *Revue de Médecine Aéronautique et Spatiale*, vol. 10, 1st Quarter, 1971, p. 34, 35. In French.

Analysis of three ejections which indicate the importance of systematic radiography of the entire spinal column after each ejection, with careful study of bone injuries. If new injuries are produced, they have a strong possibility of affecting the vertebrae above and below previous fractures. The problem of slipped disks and the appearance of arthritism must not be underestimated. F.R.L.

**A71-28516** Preavoidance blood pressure elevations accompanied by heart rate decreases in the dog. David E. Anderson and Joseph V. Brady (Johns Hopkins University, Baltimore, Md.). *Science*, vol. 172, May 7, 1971, p. 595-597. 20 refs. NIH Grant No. HE-06945.

Blood pressure and heart rate were monitored continuously in five dogs for 1 hr before performance on a free-operant shock-avoidance task. Cardiovascular changes during the preavoidance hour were characterized by sustained and significant increases in blood pressure, and sustained and significant decreases in heart rate. Specifically, progressive elevations in both systolic and diastolic pressure have been observed concurrently with progressive decreases in heart rate during a fixed 1-hr interval immediately and systematically preceding a required 2-hr shock-avoidance task.

G.R.

**A71-28657** # Hydroelastic effects in the aorta bifurcation zone (Gidroprugnie iavleniya v zone bifurkatsii aorty). A. S. Vol'mir, M. S. Gershtein, and B. A. Purinia (Voenno-Vozduzhnaia Inzhernaiia Akademiia, Moscow, USSR; Akademiiia Nauk Latviiskoi SSR, Institut Mekhaniki Polimerov, Riga, Latvian SSR). *Mekhanika Polimerov*, vol. 7, Jan.-Feb. 1971, p. 164-166. 6 refs. In Russian.

Mathematical analysis of the mechanical behavior of the vessels and blood at the point of aorta bifurcation, using a monostratal homogeneous shell as the aorta model with allowance for the fact that the aorta intima is less rigid than other aorta tissues. The study also assumes that the blood in large vessels is a viscous Newtonian liquid whose motion is described by the Navier-Stokes equations and a continuity equation. The dynamics of the blood flow in the aorta bifurcation zone is discussed on the basis of the results.

V.Z.

**A71-28658** # Determination of the elastic characteristics of a compact bone tissue by studying the natural oscillation frequencies (Opredelenie uprugikh kharakteristik kompaktnoi kostnoi tkani metodom issledovaniia chastoty sobstvennykh kolebaniii). Iu. Zh. Saulgozis, G. O. Pfafrod, I. V. Knets, and Kh. A. Ianson (Akademiiia Nauk Latviiskoi SSR, Institut Mekhaniki Polimerov, Riga, Latvian SSR). *Mekhanika Polimerov*, vol. 7, Jan.-Feb. 1971, p. 167-172. 16 refs. In Russian.

A device designed for measurements of the elastic modulus in polymer materials was used for studying bending and torsional oscillations in rectangular specimens of femur and tibia. A procedure is described for calculating the elastic and shear moduli of bone tissues from such measurements. Numerical values are given for these moduli in bones. Measurements in bones stored for 10, 75, and 135 days postmortem at temperatures from -4 to -7°C showed an increase in the elastic modulus with time.

V.Z.

**A71-28672** # Vestibular reactions (Vestibuliarnye reaktsii). Iu. G. Grigor'ev, Iu. V. Farber, and N. A. Volokhova. Moscow, Izdatel'stvo Meditsina, 1970. 195 p. 257 refs. In Russian.

The quantitative sensitivity and reactivity characteristics of the vestibular analyzer are discussed. The nature of the functional relationship between the various parameters of the adequate stimulus and the nonauditory part of the labyrinth is described. The nature of the reactions of the organism and its adaptation to coriolis forces applied periodically over a time interval of the order of 15 days is examined. The reaction of the vestibular analyzer to various external factors is studied, with particular reference to ionizing radiation. V.P.

**A71-28677** Extraterrestrial life and its detection methods (Zhizn' vne zemli i metody ee obnaruzheniya). Edited by A. A. Imshenetskii. Moscow, Izdatel'stvo Nauka, 1970. 207 p. In Russian.

Review of life conditions in the universe and genesis of life on and beyond the earth, presenting extraterrestrial life detection methods including the use of nutrient media, photometry, determination of tagged carbon dioxide or adenosine triphosphate, and detection of ferro-porphyrin proteins. The resistance and adaptation of some of the simplest desert and tundra soil microorganisms to extremal environmental factors simulating Martian or space conditions in terms of low pressure, anoxia, and intense cooling are studied. The propagation possibilities of viable germs through cosmic space are examined in light of microbiological meteorite investigations, noting means and methods of spacecraft sterilization.

M.V.E.

**A71-28678** # Life conditions in the universe (Uslovija zhizni vo vselennom). V. G. Fesenkov. In: *Extraterrestrial life and its detection methods* (Zhizn' vne zemli i metody ee obnaruzheniya).

Edited by A. A. Imshenetskii. Moscow, Izdatel'stvo Nauka, 1970, p. 7-16. 23 refs. In Russian.

On the basis of comparisons of various materials, it is shown that the chemical elements included in the composition of our galaxy have always been present in the universe and that the existence probability of some antimatter is extremely remote. The simplest hydrocarbon compounds (characteristic also of comet cores) come into existence in the interstellar medium. This is aided by dust particles consisting mostly of graphite. A complex organic substance, including some fundamental DNA-constituent groups, could form in carbonaceous chondrites (i.e., the oldest meteorites) in preplanetary times. It is felt that all this tends to indicate that hydrocarbons form the only foundation for life development in the universe. With the passage of time, the number of dark dwarfs is growing ever further, and the universe becomes less suitable for life.

M.V.E.

**A71-28679** # Genesis of life on and beyond the earth (Vozniknovenie zhizni na zemle i za ee predelami). A. I. Oparin. In: *Extraterrestrial life and its detection methods* (Zhizn' vne zemli i metody ee obnaruzheniya).

Edited by A. A. Imshenetskii. Moscow, Izdatel'stvo Nauka, 1970, p. 16-27. 25 refs. In Russian.

The possibility of extraterrestrial life is considered in the light of the materialistic view of life as one of the stages in the general process of matter development. The merits of carbon as the chemical foundation of life are discussed. Arguments are presented in favor of life existence only on a single type of cosmic bodies, i.e., on planets alone, the presence of water being supposed to form the main prerequisite. Confidence is expressed in the capability of spaceflight to help elucidate many of the moot questions.

M.V.E.

**A71-28680** # Detection of extraterrestrial life (Obnaruzhenie zhizni vne zemli). A. A. Imshenetskii. In: *Extraterrestrial life and its detection methods* (Zhizn' vne zemli i metody ee obnaruzheniya).

Edited by A. A. Imshenetskii. Moscow, Izdatel'stvo Nauka, 1970, p. 27-41. In Russian.

The fundamentals are set forth of the evolution of chemical elements in the cosmos that led to the formation of various organic substances such as those uncovered in meteoritic carbonaceous chondrites. Possible extraterrestrial life forms are considered, along with the probability of presence of various groups of microorganisms on Mars. Requirements are examined that extraterrestrial life detection methods should fulfill, and some indirect life detection methods are reviewed. In particular, various cell proliferation detection methods are examined. Some of the design principles are discussed of automatic biological stations to be sent to the planets for extraterrestrial life detection. M.V.E.

**A71-28681 # Nutrient media applicable to microorganism detection on Mars (Pitatel'nye sredy, kotorye mogut byt' primeneny dlia obnaruzheniya mikroorganizmov na Marse).** L. A. Kuzurina and V. M. Iakshina. In: Extraterrestrial life and its detection methods (Zhizn' vne zemli i metody ee obnaruzheniya). Edited by A. A. Imshenetskii. Moscow, Izdatel'stvo Nauka, 1970, p. 41-47. 12 refs. In Russian.

A selection was performed of the optimal mineral-organic medium for the growth of soil microorganisms extracted from the desert soils of Africa and Karakum, arid gray soil of Pamir, sandy soil of Alma Ata, and red soil of Georgia. It is assumed that life conditions in these soils bear some remote resemblance with those in Martian soils. M.V.E.

**A71-28682 # Photometry application in the ultraviolet and visible spectral regions to the recording of microorganism reproduction in a liquid medium (Primenenie fotometrii v ul'trafioletovoi i vidimoi oblasti dlia registratsii razmnozheniya mikroorganizmov v zhidkoi srede).** G. G. Sotnikov. In: Extraterrestrial life and its detection methods (Zhizn' vne zemli i metody ee obnaruzheniya). Edited by A. A. Imshenetskii. Moscow, Izdatel'stvo Nauka, 1970, p. 47-53. 9 refs. In Russian.

The possibilities are appraised of applying photometric methods to the detection of signs of extraterrestrial life on Mars. It is shown that photometry in the ultraviolet and visible spectral regions can help detect microorganism reproduction and decay. M.V.E.

**A71-28683 # Adenosine triphosphate determination in extraterrestrial life detection (Oprudelenie adenozintrifosfata pri obnaruzhenii zhizni vne zemli).** S. A. Butenko, L. M. Mukhin, and E. I. Milekhina. In: Extraterrestrial life and its detection methods (Zhizn' vne zemli i metody ee obnaruzheniya). Edited by A. A. Imshenetskii. Moscow, Izdatel'stvo Nauka, 1970, p. 53-60. In Russian.

Description of a highly sensitive, quantitative ATP-determination method using an extract of the luminescent organs of fireflies. The method is based on the fact that the fermentative oxidation of the luciferin in the extract occurs only in the presence of ATP. M.V.E.

**A71-28684 # Detection of ferro-porphyrin proteins in extraterrestrial life searches (Obnaruzhenie zhelezoporfirinovykh belkov pri poistakh zhizni vne zemli).** G. G. Sotnikov and S. A. Butenko. In: Extraterrestrial life and its detection methods (Zhizn' vne zemli i metody ee obnaruzheniya). Edited by A. A. Imshenetskii. Moscow, Izdatel'stvo Nauka, 1970, p. 60-71. 18 refs. In Russian.

The possibility is studied of using the biochemical luminescence reaction for determining porphyrin containing proteins of microorganisms. It is shown that the kinetics of the reaction with porphyrin-containing proteins differs both in amplitude and in chemoluminescent signal duration from the kinetics of reactions with iron-containing catalysts of nonhemin origin. The kinetics of luminol peroxide reactions with soil microflora, with pure bacterial cultures, and with chemically pure porphyrin-containing protein preparations

are altogether identical. No preliminary cell wall dissolution by lysis agents is required for recording the signal of ferro-porphyrin presence. M.V.E.

**A71-28687 # Resistance of Colpoda maupasi infusoria to low pressure, anoxia, and intense cooling (Ustoichivost' infuzorii Colpoda maupasi k nizkomu davleniju, anoksii i glubokomu okhla-zhdeniju).** V. N. Bychenkova and L. K. Lozina-Lozinskii. In: Extraterrestrial life and its detection methods (Zhizn' vne zemli i metody ee obnaruzheniya). Edited by A. A. Imshenetskii. Moscow, Izdatel'stvo Nauka, 1970, p. 81-97. 21 refs. In Russian.

The resistance and adaptation of the simplest organisms to extremal influences are investigated, and their tolerance of conditions similar to those on Mars is studied. Results of experiments, using a special apparatus imitating some Martian life conditions, indicate that Colpoda infusoria are capable of reproduction in a flow-through atmosphere of air or nitrogen containing mere traces of oxygen. At rest in latency, they are resistant to intense cooling, as well as to ultraviolet irradiation. M.V.E.

**A71-28688 # Influence of a set of extremal factors on biologically active substances (Vliyanie kompleksa ekstremal'nykh faktorov na biologicheski aktivnye veshchestva).** E. V. Belikova, G. S. Komolova, and I. A. Egorov. In: Extraterrestrial life and its detection methods (Zhizn' vne zemli i metody ee obnaruzheniya).

Edited by A. A. Imshenetskii. Moscow, Izdatel'stvo Nauka, 1970, p. 97-106. 14 refs. In Russian.

Principal differences between physical conditions existing on Mars and on Earth are reviewed. Martian conditions are simulated and their influence on proteins is examined using RNA-ase as an example. Particular attention is given to the effect of low temperatures and strong ultraviolet radiation. O.H.

**A71-28689 # Effect of a high vacuum on microorganisms (Deistvie glubokogo vakuuma na mikroorganizmy).** A. A. Imshenetskii and S. V. Lysenko. In: Extraterrestrial life and its detection methods (Zhizn' vne zemli i metody ee obnaruzheniya).

Edited by A. A. Imshenetskii. Moscow, Izdatel'stvo Nauka, 1970, p. 106-118. 9 refs. In Russian.

Experiments designed to determine the high-vacuum resistance of 15 bacteria strains, 7 fungus species, 5 yeast strains and 5 seaweed species. The survival rates after 72-hr exposures were 100% for *Bacillus mesentericus*, *Bac. mycooides*, *Bac. megaterium*, *Bac. simplex*, *Aspergillus oryzae*, *Asp. terreus* and *Actinomyces globisporus*, 52 to 76% for *Bacillus lini*, *Bac. subtilis*, *Bac. mesentericus niger*, *Micrococcus luteus*, *Micrococcus aurantiacus* and *Sarcina flava*, 22 to 34% for *Saccharomyces vini* and *Candida tropicalis*, and lower per cent for *Pseudomonas fluorescence*, *Serratia marcescens*, *Vibrio metchnikovii*, *Zygosaccharomyces vini*, *Torulopsis aeria*, *Rhodotorula rubra*, *Trichothecium roseum* and *E. coli*. It is concluded that a high vacuum of about 10 nanometer Hg would not obstruct the interplanetary transport of microorganisms in outer space. V.Z.

**A71-28690 # Behavior of some soil microorganisms in an 'artificial Mars' chamber (Povedenie nekotorykh pochvennykh mikroorganizmov v kamere 'iskusstvennyi Mars').** L. A. Kuzurina and V. M. Iakshina. In: Extraterrestrial life and its detection methods (Zhizn' vne zemli i metody ee obnaruzheniya).

Edited by A. A. Imshenetskii. Moscow, Izdatel'stvo Nauka, 1970, p. 118-125. 13 refs. In Russian.

Xerophyte microorganisms extracted from the soils of the Karakum desert, Pamir highlands, and Dikson Island show different degrees of stability in an artificial Martian environment. *Mycococcus oligonitrophilus* reproduces in the 'artificial Mars' chamber at a maximum hygroscopic moisture (3.8%) of the limonite. A 7.6 to 23-fold increase in the number of cells is reached on the 14th day.

Bacillus aegypticus displays stability; the number of its cells does not decrease. M.V.E.

**A71-28691 # Possibility of the spreading of viable germs in outer space (Vozmozhnost' rasprostraneniia zhiznesposobnykh zarodyshei v kosmicheskem prostranstve).** R. I. Fedorova. In: Extraterrestrial life and its detection methods (Zhizn' vne zemli i metody ee obnaruzhenii). Edited by A. A. Imshenetskii. Moscow, Izdatel'stvo Nauka, 1970, p. 125-135. 27 refs. In Russian.

The possibility of germ survival and transport in outer space is discussed on the basis of present theories and experimental data, including also studies of material particle transport between celestial bodies by Arrhenius (1909, 1911), and studies by Oparin (1957), Imshenetskii (1964) and Shklovskii (1965) who came to the conclusion that among other unfavorable environmental factors UV radiation is most detrimental for the survival of germs and spores in outer space. UV radiation inactivation doses are given for a large group of germ strains. Recent experiments concerning survival of *Bacillus megaterium* spores exposed to UV radiation are described, showing that spores can survive bactericidal UV doses when shielded by a layer of tuff dust. Similar experiments with *Bacillus cereus* spores protected by chromium films are also described. V.Z.

**A71-28692 # Meteorites and life (Meteoriy i zhizn').** G. P. Vdovkin. In: Extraterrestrial life and its detection methods (Zhizn' vne zemli i metody ee obnaruzhenii). Edited by A. A. Imshenetskii. Moscow, Izdatel'stvo Nauka, 1970, p. 135-157. 35 refs. In Russian.

Study of the nature of hydrocarbons, amino acids, and large-molecule organic compounds in chondrite meteorites from the viewpoint of the origin of life on earth. It is shown that organic compounds in meteorites are formed by abiogenetic reactions. Also, no fossilized microorganisms were detected in meteorites. Possible ways of seeding life on earth by meteorites, and the possible contribution of meteoritic organic compounds to the formation of life on earth are discussed. Z.W.

**A71-28693 # Microbiological investigations of meteorites (Mikrobiologicheskie issledovaniia meteoriotov).** A. A. Imshenetskii and S. S. Abyzov. In: Extraterrestrial life and its detection methods (Zhizn' vne zemli i metody ee obnaruzhenii). Edited by A. A. Imshenetskii. Moscow, Izdatel'stvo Nauka, 1970, p. 157-166. 25 refs. In Russian.

Study of the penetration of microorganisms into rocks and meteorites under various climatic conditions. It is shown that no reliable results can be obtained from a search for extraterrestrial microorganisms in meteorites that were exposed to the ground for a prolonged period of time. Under any climatic conditions, the most important factor enhancing the penetration of microorganisms into meteorites is humidity. Some interesting results can only be obtained from meteorites that fell on stony ground, snow, or sand, and that were recovered shortly after the fall. Z.W.

**A71-28694 # Current methods and means for sterilization of space objects (Sovremennye metody i sredstva sterilizatsii kosmicheskikh ob'ektov).** V. I. Vashkov. In: Extraterrestrial life and its detection methods (Zhizn' vne zemli i metody ee obnaruzhenii). Edited by A. A. Imshenetskii. Moscow, Izdatel'stvo Nauka, 1970, p. 167-176. 18 refs. In Russian.

Review of sterilization techniques studied in the Soviet Union and the United States covering hot air, ionizing radiation, UV light, ethylene oxide with or without Freon or methyl bromide, and hydrogen peroxide. Also discussed is the use of bactericidal materials such as cellulose fabrics and polyvinyl fiber containing heavy metal salts, antibiotics, tetra-ammonium compounds and phenols. Rubber containing bactericides, and self-sterilized lacquers and coatings are mentioned as means for sterilization of surfaces. V.Z.

**A71-28695 # Physiology of spore germination - *Bacillus stearothermophilus* (O fiziologii prorastaniia spor - *Bacillus stearothermophilus*).** V. I. Seregin. In: Extraterrestrial life and its detection methods (Zhizn' vne zemli i metody ee obnaruzhenii).

Edited by A. A. Imshenetskii. Moscow, Izdatel'stvo Nauka, 1970, p. 176-184. 22 refs. In Russian.

Spore germination is stimulated by preheating to 100°C for 10 min. An amino acid concentration of 0.01 mol in an L-arginine medium is optimal for germination. An increase in carbohydrate concentration from 0.001 to 0.1 mol results in a rise of the germination percentage; trehalase in 0.01-mol concentration is most effective. M.V.E.

**A71-28696 # Spacecraft sterilization (Sterilizatsiya kosmicheskikh apparatov).** A. A. Imshenetskii and S. S. Abyzov. In: Extraterrestrial life and its detection methods (Zhizn' vne zemli i metody ee obnaruzhenii). Edited by A. A. Imshenetskii. Moscow, Izdatel'stvo Nauka, 1970, p. 184-202. 47 refs. In Russian.

Review of approaches to spacecraft sterilization covering the effects of extreme space environment conditions on microorganisms, interplanetary unmanned lander sterilization techniques, manned spacecraft sterilization, sterile planet rock sample acquisition and processing, and planetary round trip spacecraft crew quarantine after return to the earth. Published data concerning microorganism life decay under sterilization, microorganism detection methods, thermal sterilization, radiation sterilization, uses of self-sterilization bactericidal materials, sterilization by filtration, and sterile spacecraft assembling are surveyed. V.Z.

**A71-28718 # Problem of the liquid state control in the blood and the relations between the coagulation, fibrinolytic and anticoagulation systems (Problema regulatsii zhidkogo sostoiania krovi i vzaimootnosheniia svertyvaiushchei, fibrinoliticheskoi i protivosvertyvaiushchei sistem).** B. A. Kudriashov (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Uspekhi Fiziologicheskikh Nauk*, vol. 1, Oct.-Dec. 1970, p. 17-63. 179 refs. In Russian.

Current views on the mechanism of liquid state control of blood in the sanguiferous canal are discussed. The topics include the hemostatic balance, the functions, nature and humoral agents of the anticoagulation system, the physiological solvents of nonstabilized fibrin, the specific action of thrombin, and the role of factors XIIa and Xa and of disseminated clots in the activation of the anticoagulation systems. Also discussed are the interaction between the coagulation and anticoagulation systems, the phenomena of prethrombosis and thrombosis as consequences of anticoagulation system depression and their prophylaxis, and the defibrillation syndrome. It is concluded that the humoral interaction of the coagulation and anticoagulation systems having a functional feedback is basic in the liquid state control mechanism of the blood. V.Z.

**A71-28719 # Food-choice and consumption control and metabolism (Reguliatsiya vybora i potrebleniia pishchi i obmen veshchestv).** V. G. Kassil', A. M. Ugolev, and V. N. Chernigovskii (Akademii Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Uspekhi Fiziologicheskikh Nauk*, vol. 1, Oct.-Dec. 1970, p. 64-97. 264 refs. In Russian.

Condensed review of current theories concerning the relation between diet and metabolism, satiation and hunger, and behavioral and vegetative factors in maintaining homeostasis. The topics include glucostatic, aminoacidostatic, lipostatic and thermostatic theories linking food intake regulation with metabolic processes, the relations between the alimentary activity and water-salt metabolism and endocrine glands, the role of nerve signals in alimentary activity control, and specific alimentary reactions. Particular attention is given to studies concerning the existence of specialized appetites, their mechanisms and hereditary and acquired factors of their regulation. Emphasis is made on the general physiology of the

relation between food intake regulation and metabolism rather than on comparative physiology and clinical aspects of the subject. V.Z.

**A71-28721** The importance of the helicopter for rescuing victims of aircraft accidents (Die Bedeutung des Hubschraubers bei der Rettung verunglückter Flugzeuginsassen). H. Schulte-Wintrop. *Wehrmedizinische Monatsschrift*, vol. 15, Apr. 1971, p. 109-112. 10 refs. In German.

Several examples illustrating the application of helicopters as a most flexible and effective rescue system are presented and discussed. To achieve the necessary close cooperation between the helicopter rescue service and ground personnel, it is suggested that suitable helicopters have to be made available to the medical corps for thorough training and practical operation tasks. Improvements have been achieved so far through more intensified training and introduction of new equipment, but perfection should be the ultimate goal in order to preserve the 'vital link' between accident, first aid, and final treatment. It is only under these circumstances that the importance of the helicopter for the rescue of air crews and passengers can be properly assessed and full use made of this system of rescue. O.H.

**A71-28788** Circadian rhythm of rat liver and lung collagenase activity. Kenneth R. Cutroneo and George C. Fuller (Rhode Island, University, Kingston, R.I.). *Life Sciences, Part II - Biochemistry, General and Molecular Biology*, vol. 10, Apr. 8, 1971, p. 395-400. 20 refs. Research supported by the Rhode Island Heart Association; NIH Grant No. HE-11578.

Collagenase activity was assayed as described by Cutroneo and Fuller (1970). A similar pattern of circadian variation of collagenase activity was observed in heart and liver tissue. Maximum enzyme activity was noted between 7:00 A.M. and 10:00 A.M. Minimum enzyme activity was observed at 1:00 P.M. in heart tissue and 7:00 P.M. in liver tissue. The possible significance of the present findings in rats in light of the circadian rhythm of urinary total and free hydroxyproline in man reported by Mautalin (1970) is pointed out. G.R.

**A71-28801** Inborn nature of the rat's 24-hour clock. Curt P. Richter (Johns Hopkins University Hospital, Baltimore, Md.). *Journal of Comparative and Physiological Psychology*, vol. 75, Apr. 1971, p. 1-4. 8 refs. NIH Grant No. 2R01-MH-00576-17; NSF Grant No. GB-6720.

Investigation of the possibility that exposure to alternating periods of light and darkness of day and night might play any role in establishing a device that measures time in units of 24 and subunits of 12 hr in Norway rats. Tests were made on a group of rats blinded just after birth and on a group of congenitally blind rats. Both groups of rats manifested this clock by alternating 12-hr phases of activity and inactivity. The results indicate that the clock is inherent; that it must have been built into the nervous system by a survival process in relation to alternating periods of light and darkness of day and night; and, further, that it must have originated in early evolutionary eras in the tropics where day and night have the same 12-hr length. M.M.

**A71-28802** Changes in food and water intake associated with an interruption of the anterior or posterior fiber connections of the hypothalamus. Sebastian P. Grossman (Chicago, University, Chicago, Ill.). *Journal of Comparative and Physiological Psychology*, vol. 75, Apr. 1971, p. 23-31. 18 refs. PHS Grant No. MH-10130.

Transverse knife cuts which interrupted posterior fiber connections of the medial hypothalamus without producing significant cellular destruction resulted in hyperphagia and hyperdipsia in female rats. Both effects were most pronounced during the first 2 wk. after surgery, but food as well as water intake remained significantly elevated 6 wk. after the cuts were made. Similar

transverse cuts through the anterior hypothalamus, just anterior to the ventromedial nuclei, also produced hyperphagia and hyperdipsia. In most animals these effects were transient. Average food intake returned to near-normal levels within 2 wk. and water intake declined to below-normal levels after 4 wk. Three rats with anterior cuts which did not appear to involve the ventromedial nuclei directly remained hyperphagic and hyperdipsic. (Author)

**A71-28803** Assessment of the role of transfer suppression in learning-set formation in monkeys. Jacqueline B. Conner and Donald R. Meyer (Ohio State University, Columbus, Ohio). *Journal of Comparative and Physiological Psychology*, vol. 75, Apr. 1971, p. 141-145. 7 refs. NIH Grant No. MH-02035.

Experimental investigation of the relationship between the development of learning sets in ten feral rhesus monkeys and transfer suppression as reflected in declines of retention of discriminations previously learned and presented as positive-transfer probes. The discriminanda were pairs of small common-use objects, and the training paradigm involved the presentations of six-trial discrimination problems. It was found that transfer suppression does occur as object-discrimination learning sets develop, but that this suppression can be disinhibited by rest intervals that have almost no effect upon retention of the learning set. Hence, although transfer suppression can develop in positive-probe situations, transfer suppression is not the mechanism of learning-set formation in monkeys. M.M.

**A71-28804** Punishment for errors and visual-discrimination learning by monkeys with inferotemporal cortex lesions. Frederic J. Manning (U.S. Army, Walter Reed Army Medical Center, Washington, D.C.). *Journal of Comparative and Physiological Psychology*, vol. 75, Apr. 1971, p. 146-152. 14 refs. NIH Grant No. MH-14471; NSF Grant No. GS-6999.

Monkeys with bilateral lesions of inferotemporal cortex or foveal prestriate cortex were trained, along with normal animals, on a series of eight simultaneous visual discriminations. In four of these problems, training was accomplished solely with positive reinforcers, but, in the other four, electric-shock punishment for errors was employed as well. On the former, both lesion groups made significantly more errors than the normal group, the foveal prestriates being slightly more impaired than the inferotemporals. On the four problems with punishment for errors, the inferotemporals were indistinguishable from the normals, whereas the foveal prestriate animals made significantly more errors than either of the other groups. M.M.

**A71-28805** On fighting in mice - Ontogenetic and experiential determinants. Robert B. Cairns and Joseph S. Nakelski (Indiana University, Bloomington, Ind.). *Journal of Comparative and Physiological Psychology*, vol. 74, Mar. 1971, p. 354-364. 12 refs. PHS Grant No. FR-07-031.

C57BL/10 male mice were isolated at 30 days of age or were reared in small groups. Isolated animals initiated more social-investigation behaviors, were more reactive to dyadic stimulation, and were more likely to attack another mouse than were group-reared mice. These differences were eliminated in adulthood by placing isolate-reared animals into small groups for an additional 5-10 wk. Observations of test and home-cage interactions indicate that (1) continued exposure to the physical-cutaneous stimulation of others serves to decrease reactivity to such stimulation, (2) heightened reactivity increases the likelihood that dyadic investigatory activity will escalate into fighting, and (3) the effects of early social experiences associated with fighting can be reversed. (Author)

**A71-28806** Electrical stimulation of inferotemporal and occipital cortex in monkeys - Effects on visual discrimination and spatial reversal performance. Stanley G. Goldrich and John S. Stamm (New York, City University, New York, N.Y.). *Journal of Com-*

## A71-28807

*Comparative and Physiological Psychology*, vol. 74, Mar. 1971, p. 448-458. 12 refs. NSF Grant No. GB-2693.

Training of four monkeys with bilaterally implanted occipital and inferotemporal (IT) electrodes on pairs of pattern discriminations. Acquisition rates were compared on blocks of testing trials preceded by EEG disturbances set off by electrical brain stimulation. IT stimulation always resulted in retarded acquisition rates while occipital stimulation had little effect on performance. Slight transient deficits were found during overtraining with IT stimulation. In a second experiment the subjects were trained on a series of spatial reversal tasks after IT stimulation and without stimulation. No significant behavior deficits occurred under the former condition. The stimulation technique used was found to be an efficient method of studying the effect of electrocortical impairment on behavior.

F.R.L.

**A71-28807** **Brainstem mechanisms underlying visually guided responses in the rhesus monkey.** Robert Thompson (Louisiana State University, Baton Rouge, La.) and Ronald E. Myers (National Institutes of Health, National Institute of Neurological Diseases and Stroke, Bethesda, Md.). *Journal of Comparative and Physiological Psychology*, vol. 74, Mar. 1971, p. 479-512. 50 refs. NIH Grant No. MH-08377.

Immature monkeys trained on three separate visual discrimination problems were subjected to bilateral lesions of the inferotemporal cortex, the posterior thalamus, the hypothalamus, or the midbrain. After a postoperative recovery period the animals were tested for retention. Those lesions which consistently led to severe losses in retention were located either within the inferotemporal cortex, the pulvinar, or the pretectal-nucleus posterior thalami region. Lesions of the midbrain (superior colliculus, subcollicular area, central gray substance, reticular formation, red nucleus, substantia nigra, or central tegmentum) produced mixed results. These findings were compared with those obtained using the rat and cat and were interpreted in terms of a corticofugal system which may be posited to mediate visual discrimination performance. (Author)

**A71-28808** **Relative novelty of solid and liquid diet during thiamine deficiency determines development of thiamine-specific hunger.** Steven F. Maier, Donna M. Zahorik, and Richard W. Albin (Illinois, University, Urbana, Ill.). *Journal of Comparative and Physiological Psychology*, vol. 74, Feb. 1971, p. 254-262. 17 refs. Research supported by the University of Illinois.

Previous experiments have found that thiamine-deficient subjects prefer new solid diets to the diet present during deficiency but do not prefer new liquids to the liquid present during deficiency. That is, thiamine-specific hunger has been shown for solid diets but not for liquids. In these experiments the familiarity of the liquid and solid was not equated. The present experiment varied the novelty of the liquid and solid diet present during thiamine deficiency. It was found that the degree of new liquid preference by thiamine-deficient subjects depended on the novelty of both the liquid and solid present during deficiency. Parallel results were found for solid-diet preferences. The relevance of these results for a learned-aversion interpretation of thiamine-specific hunger was discussed. (Author)

**A71-28809** **Set and uncertainty as factors influencing anticipatory cardiovascular responding in humans.** J. David Higgins (Harvard University, Boston, Mass.). *Journal of Comparative and Physiological Psychology*, vol. 74, Feb. 1971, p. 272-283. 21 refs.

Human heart-rate and vasomotor activity were monitored while the subjects' expectancies concerning which of two stimuli would occur were manipulated. One stimulus demanded a button-press response while the other required the subject not to respond. In one group this response served merely to detect the respond stimulus, while in a second group it was given the added dimension of being a reaction-time response. In both groups cardiovascular activity leading up to stimulus onset was observed to be a function of stimulus

uncertainty rather than a simple function of the respond stimulus's expectancy. It was concluded that anticipatory cardiovascular responding reflected the attentional requirements of the task rather than simple motor preparation. (Author)

**A71-28810** **Luminance and luminous flux discrimination in rats after early visual deprivation.** Richard C. Tees (British Columbia, University, Vancouver, Canada). *Journal of Comparative and Physiological Psychology*, vol. 74, Feb. 1971, p. 292-297. 16 refs. National Research Council of Canada Grant No. APA-179; Medical Research Council of Canada Grant No. MA-2653.

A comparison was made of the performance of light- and dark-reared rats on an intensity discrimination in which only luminance differences were relevant. An attempt was also made to evaluate which cue is used by these rats in acquiring a discrimination in which both luminance and flux cues are available, and a discrimination in which both luminous flux and size cues are available. The findings obtained are discussed in terms of the effect of visual deprivation on selective attentional and information-processing mechanisms. O.H.

**A71-28833** **Dark adaptation in strabismic amblyopia - The use of acuity targets.** J. T. Flynn and L. R. Duffner (Miami University, Miami, Fla.). *Ophthalmic Research*, vol. 1, no. 6, 1970, p. 365-376. NIH Grant No. EY-00376-02.

Acuity-dark adaptation curves for 11 different sized Landolt Cs were performed on the normal and amblyopic eye of 5 strabismic amblyopes. The results of these studies are presented and possible mechanisms which might account for defects in acuity-dark adaptation are discussed. (Author)

**A71-28864** **A technique for recording ECG and deep body temperature signals in the presence of a large amplitude rf field.** Walter C. Dolle and Octavius L. Jouffray (Southwest Research Institute, San Antonio, Tex.). In: Institute of Electrical and Electronics Engineers, Regional Electromagnetic Compatibility Symposium, San Antonio, Tex., October 6-8, 1970, Record.

New York, Institute of Electrical and Electronics Engineers, Inc., 1970, p. I-E-1 to I-E-11. Contract No. AF 41(609)-67-C-0025.

Description of an isolation system which has been successfully used for recording low level ECG and deep body temperatures while the test animals (Macaca mulatta monkeys) were exposed to rf fields as great as 6000 V/m and energy density as high as 800 mw/sq cm. The method uses a novel form of helical resonator which maintains the test subject at the normal rf potential while the ECG and temperature signals are simultaneously transmitted outside the exposure chamber and recorded at rf ground potential level. There were several cases of rf burns on the test animals and dramatic temperature excursions that correlated with the transmitter output level. F.R.L.

**A71-28887** **Summated cerebral evoked responses to taste stimuli in man.** M. Funakoshi and Y. Kawamura (Osaka University, Osaka, Japan). *Electroencephalography and Clinical Neurophysiology*, vol. 30, Mar. 1971, p. 205-209. 14 refs.

The evoked cortical responses to taste solutions applied to the human tongue surface were recorded by the averaging technique. The response was characterized by two positive waves with onset latencies of approximately 150 msec and 500-1500 msec. The early wave was due to mechanical stimulation by pouring the solution on the tongue surface, and the late wave was the gustatory response. The gustatory response to acid and salt was significant, but that to sucrose and quinine hydrochloride was not visible as far as 40 responses were summated. The reasons for this effect are discussed. M.M.

**A71-28888** The visual evoked response obtained with an alternating barred pattern - Rate, spatial frequency and wave length. James G. May, William B. Forbes, and Thomas P. Piantanida (Houston, University; Texas, University, Houston, Tex.). *Electroencephalography and Clinical Neurophysiology*, vol. 30, Mar. 1971, p. 222-228. 12 refs. NIH Grant No. NB-07608.

The amplitude and latency of the averaged visual evoked response (VER) recorded from the area of the occiput in man was found to be related to the rate of alternation and the spatial frequency of the alternating barred pattern used to elicit the responses. The amplitude of the VER was determined, to a large extent, by the background illumination, but VER latency was unaffected by this variable. Changes in the area of the pattern resulted in amplitude decrements and latency increments, especially between 5 and 2 deg of visual angle subtended. Differences in the wavelength of patterns photometrically equated for brightness did not result in significant differences in amplitude or latency. The results are related to the findings of previous studies using patterned stimulation. M.M.

**A71-28889** A compact six-channel integrated circuit EEG telemeter. R. W. Vreeland, C. L. Yeager, and J. Henderson, Jr. (California, University, San Francisco, Calif.). *Electroencephalography and Clinical Neurophysiology*, vol. 30, Mar. 1971, p. 240-245. 8 refs. Contract No. N 00014-70-C-0248.

Description of a lightweight head-mounted telemeter which permits artifact-free EEG recording during laughter. By using pulse position modulation and reduced battery voltages, it has been practical to employ integrated circuits without excessive battery drain. Clip-on rechargeable battery packs facilitate recording for fairly long periods. The use of low noise preamplifiers with 'micropak' transistors has made it practical to telemeter small amplitude EEGs from normal subjects. Either needle or disk electrodes can be used. Depth electrodes can be used with external attenuators. Since the transmitter is crystal controlled, it has virtually no frequency drift. With the addition of external networks, the telemeter can be used for respiration, EKG and galvanic skin response recording. M.M.

**A71-28890** Habituation and dishabituation of the human vertex response. H. Fruhstorfer (Helsinki University, Helsinki, Finland). *Electroencephalography and Clinical Neurophysiology*, vol. 30, Apr. 1971, p. 306-312. 22 refs.

This study was made in five human subjects who received short trains of auditory (C) or somatosensory (S) stimuli. Both C and S stimulation resulted in rapid habituation of the vertex response. Simultaneously, stimulus generalization developed across these two modalities as the heteromodal stimulus in a train evoked a response whose latencies and amplitudes had values lying between those observed in the habituated and nonhabituated responses to the same stimulus. From neither modality could dishabituation be elicited in the other. The results can be explained on the assumption that auditory and somatosensory information converge in a subcortical center and ascend in a common corticopetal pathway. Thus, this study supports the hypothesis that the vertex response is mediated by an extralemniscal system. M.M.

**A71-28891** Human odorant evoked responses - Effects of trigeminal or olfactory deficit. D. B. Smith, T. Allison, W. R. Goff, and J. J. Principato (U.S. Veterans Administration Hospital, West Haven; Yale University, New Haven, Conn.). *Electroencephalography and Clinical Neurophysiology*, vol. 30, Apr. 1971, p. 313-317. 10 refs. Research supported by the U.S. Veterans Administration, NIH Grant No. MH-05286.

Investigation whether the odorant evoked response (OER) is due to stimulation of olfactory receptors, or of nasal trigeminal afferents in the human nose. OER was recorded in two subjects with total facial hemianesthesia, in one subject with unilateral loss of olfaction, and in three normal subjects following cocaine block of the olfactory

area or block of all nasal mucosa excluding the olfactory area. Stimulation was unilateral. In all subjects normal OERs were recorded in response to stimulation of the normal nostril. Lack of trigeminal innervation resulted in abolition of the OER, whereas loss of olfactory function usually produced no OER change. The OER as recorded under these experimental conditions thus appears to be evoked solely by stimulation of nasal trigeminal afferents. M.M.

**A71-28892** The effects of repetitive stimulation on auditory evoked potentials. W. R. Webster (Monash University, Clayton, Victoria, Australia). *Electroencephalography and Clinical Neurophysiology*, vol. 30, Apr. 1971, p. 318-330. 22 refs. Research supported by the Australian Research Grants Committee.

Evoked potentials were recorded in the cochlear nucleus, inferior colliculus, and medial geniculate body of unanesthetized cats in response to repetitive auditory stimuli. The effects of stimulus intensity and rate of stimulation were studied with the use of factorial experimental designs. Changes typical of an habituation process did not occur. Although amplitude decrements occurred in which the magnitude of the decrement was a function of the rate of stimulation, it was concluded that these decrements were simple rate effects more akin to refractory changes than to habituation effects. In the inferior colliculus, the effects of rate of stimulation depended on the area of the nucleus from which recordings were taken. M.M.

**A71-28893** Topological characteristics of the visual evoked response in man. J. R. Bourne, D. G. Childers, and N. W. Perry, Jr. (Florida, University, Gainesville, Fla.). *Electroencephalography and Clinical Neurophysiology*, vol. 30, May 1971, p. 423-436. 46 refs. PHS Grants No. EY-00581; No. EY-00077.

It is shown that distinctive evoked potential field patterns may be elicited as a result of stimulation of the human retina and that these patterns are affected by changes in stimulus parameters. A relatively dense electrode array on the occipital scalp was used in the investigations. The temporal variation of the spatial potential gradient defined by the summated visual evoked response appears to have a rotational tendency. Groups of potentials appear over large areas of the occipital scalp and rotate after presentation of a light stimulus, suggesting that underlying neuronal populations may be firing in synchrony. G.R.

**A71-28902** # Toxicological evaluation of carbon monoxide in humans and other mammalian species. James Theodore (USAF, Washington, D.C.; Stanford University, Stanford, Calif.), Robert D. O'Donnell (USAF, Washington, D.C.; California, University, Los Angeles, Calif.), and Kenneth C. Back (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio). *Journal of Occupational Medicine*, vol. 13, May 1971, p. 242-255. 40 refs.

The main objective of the investigations reported was to determine a set of realistic conditions which can be applied in predicting what will impair pilot performance in an aircraft environment. Exposure to relatively high levels of CO for 168 days had no apparent effect on animal survivability, growth rates or clinical chemistry. Although rats showed some cardiac hypertrophy, all the larger animals, including dogs, baboons, and monkeys, failed to show cardiovascular changes. No performance decrements were found in humans during three-hour exposures of 50 to 250 ppm CO. It is concluded that carbon monoxide within the conditions of the experiments does not impair the kinds of abilities required to perform space docking procedures, instrument landings of aircraft, or high speed automobile driving. G.R.

**A71-28951** Effect of bicycling on the baroreflex regulation of pulse interval. J. D. Bristow (Oregon, University, Portland, Ore.), E. B. Brown, Jr. (Kansas, University, Lawrence, Kan.), D. J. C. Cunningham, M. G. Howson, P. Sleight (Oxford University; Radcliffe Infirmary, Oxford, England), E. Strange Petersen (Århus Universitet, Århus, Denmark), and T. G. Pickering. *Circulation Research*, vol. 28,

## A71-28952

May 1971, p. 582-592. 23 refs. Research supported by the British Heart Foundation.

The reflex control of pulse interval during erect bicycle exercise was studied in nine normal subjects aged 18 to 28, breathing an oxygen-rich mixture. Rises in the directly measured arterial pressure were produced by intravenous injections of phenylephrine, and systolic pressure was correlated with the following pulse interval. The slope of the systolic pressure-pulse interval relation was used to express reflex sensitivity. With increasing exercise, the reflex sensitivity decreased progressively so that at a level of exercise which produced a heart rate of 150/min there was no reflex cardiac slowing in response to a provoked rise of pressure. The reduction in reflex sensitivity was studied during the changes from rest to exercise and vice versa. Reflex sensitivity decreased within 5 seconds of the onset of exercise. (Author)

**A71-28952 Further studies of a natriuretic substance occurring in human urine and plasma.** Jean E. Sealey and John H. Laragh (Columbia University; Presbyterian Hospital, New York, N.Y.). *Circulation Research*, vol. 28, May 1971, Supplement no. 2, p. II-32 to II-42; Discussion, p. II-42, II-43. 17 refs. PHS Grant No. HE-01275.

Description of studies which provide additional physiological and biochemical characterization of a natriuretic agent which has been identified in extracts of plasma and urine of human subjects. The natriuretic activity of active fractions was consistently demonstrable in normal hydropenic rats as well as in rats with congenital diabetes insipidus. The induced natriuresis usually developed slowly and could last for several hours. The natriuresis was not usually associated with increases in water or potassium excretion. It occurred without measurable changes in glomerular filtration rate or arterial blood pressure. Altogether, these results suggest that the substance acts to depress sodium reabsorption in the distal tubule. In bioassays of similarly prepared fractions using direct perfusion of the renal artery, an immediate and transient natriuresis has been consistently observed. M.M.

**A71-28953 Whole-body circulatory autoregulation and hypertension.** Thomas G. Coleman, Harris J. Granger, and Arthur C. Guyton (Mississippi, University, Jackson, Miss.). *Circulation Research*, vol. 28, May 1971, Supplement no. 2, p. II-76 to II-86; Discussion, p. II-86, II-87. 80 refs. PHS Grant No. HE-11678.

Description of a theoretical relationship between the autoregulation of blood flow and the control of blood pressure, together with data relevant to the theory. Autoregulation of blood flow has been observed in a number of the body's tissues, and the summated effect, whole-body autoregulation, has been demonstrated in areflex dogs. An increase in cardiac output precedes an increase in total peripheral resistance, and a decrease in cardiac output precedes a decrease in total peripheral resistance. The gain of the system was calculated to be slightly greater than three. This same hemodynamic pattern, that is, an increase in cardiac output preceding an increase in resistance, has been observed at the onset of hypertension. Increases in cardiac output have been observed at the beginning of salt-induced hypertension in dogs and at the beginning of hypertension secondary to fluid volume expansion in anephric patients, while other investigators have observed this hemodynamic pattern in a number of instances, including labile hypertension, perinephritis hypertension, and Goldblatt hypertension. M.M.

**A71-29001 Analog simulation of A-V conduction block and Wenckebach phenomenon.** V. Ličko and H. D. Landahl (California, University, San Francisco, Calif.). *Computers in Biology and Medicine*, vol. 1, Apr. 1971, p. 185-192. 9 refs. Research supported by the University of California.

The study of a mathematical model of V-A conduction block and Wenckebach phenomenon, based on a two-factor excitation and conduction theory, is aided by analog simulation. P and R wave generators and two generators of internal functions of the model

with a comparator constituted the main five components of the electronic analog. The role of several parameters of the model may be shown. Variation of a single parameter can account for the progressively increasing P-R intervals which follow a skipped beat as well as the rarity of Wenckebach ratios above 8:7. It suggests an approach to differential diagnosis of reduced sensitivity from reduced recovery. (Author)

**A71-29002 Computation of solutions to the inverse problem of electrocardiography.** H. Stephen Schloss. *Computers in Biology and Medicine*, vol. 1, Apr. 1971, p. 193-198.

Review of major efforts in developing a valid method of mathematically transforming ECG, VCG, etc., data into a form that provides approximate diagnoses such as 'septal ventricular infarct of moderate size.' The efforts include a recent stochastic identification approach suggested and tested (Selvester et al., 1967; Schloss, 1968). Difficulties inherent in these techniques are outlined and assessed. In the development of some approaches such as Fourier analysis of ECGs, it appears that at best one can only succeed in transforming the difficult problem of relating ECGs to the physiological condition of the myocardium into the more difficult and possibly unsolvable problem of relating Fourier coefficients derived from ECGs to the physiological condition. It is pointed out that the most promising current technique under study is a modified version of the stochastic identification approach which employs dipole models in which the parameters have a range of several discrete values. A computer program that employs this approach is described. M.M.

**A71-29003 An automated data acquisition and analysis system for a cardiac catheterization laboratory.** Emmanuel Mesel and Michael Gelfand (Stanford University, Palo Alto, Calif.). *Computers in Biology and Medicine*, vol. 1, Apr. 1971, p. 199-213. 5 refs. NIH Grant No. FR-00311.

A photokymographic and analog magnetic tape recording system was modified to facilitate automatic data acquisition during cardiac catheterization for subsequent automatic analysis by a digital computer. Independence from computer failure and economical use of computer services were thus achieved. Information gathering was automated by replacing manually operated with electrically driven valves, and by using an electromechanical programming switch to provide strict temporal formatting. Hardware and programming features for automatic analysis are described in detail. (Author)

**A71-29004 Convective dispersion of blood gases in curved channel exchangers.** Hsin-Kang Chang and Lyle F. Mockros (Northwestern University, Evanston, Ill.). *AIChE Journal*, vol. 17, May 1971, p. 541-549. 23 refs. NIH Grants No. GM-00874; No. GM-15418.

The rates of hemoglobin saturation and carbon dioxide reduction in blood flowing in a curved channel membrane exchanger were studied theoretically by considering the fluid-limited process and the wall-limited process. The fluid-limited process was studied for laminar flows with and without secondary circulations. The relatively nontraumatic centrifugally induced circulations in the curved channel can reduce the required channel length to less than 1/500 that required for unperturbed flow. Such improvement, however, is practical only if very permeable membranes are available. If the partial oxygen pressure is 715 mm Hg and the partial carbon dioxide pressure is 0 mm Hg at the walls, the fluid-limited analyses show oxygenation to be the slower process and the wall-limited analyses indicate carbon dioxide removal to be the limiting process. If the best available silicone rubber membranes are used, the process will be fluid-limited for the unperturbed flow and wall-limited for the flow with secondary circulations. (Author)

**A71-29031 A protocol for B-scan and radiographic foreign body localization.** D. Jackson Coleman and Stephen L. Trokel (Columbia-Presbyterian Medical Center, New York, N.Y.). *American*

*Journal of Ophthalmology*, vol. 71, Jan. 1971, pt. 1, p. 84-89. 5 refs. NIH Grant No. EY 00275-04.

An approach to intraocular foreign body localization is described which combines radiographic and ultrasonic methods. This combined approach overcomes many limitations present in either method. A formal schematic outline has been evolved which increases the chance for accurate localization. The data are presented in a chart which shows all information derived from both the radiographic and ultrasonic examination. G.R.

**A71-29032 Iris mechanics. I - Influence of pupil size on dynamics of pupillary movements.** Irene E. Loewenfeld and David A. Newsome (Presbyterian Hospital; Columbia University, New York, N.Y.). *American Journal of Ophthalmology*, vol. 71, Jan. 1971, pt. 2, p. 347-362. 7 refs. Research supported by the Harriman Fund; PHS Grants No. NB 00253; No. 5-K3-NB-16,542.

Different pupil diameters were obtained with autonomic drugs which were instilled into the eye, leaving the untreated opposite eye as control. The pupillary reflexes were then elicited at various stages of the drug responses. It was shown that the pupil has a linear range of movement within which both contractions to light and dilations to darkness move freely. Beyond this range the movements rather abruptly decrease in velocity and extent. This reduction in function occurs at a particular pupil diameter, fixed in each eye, regardless of the intensity of the stimulus or the pupil size at the beginning of stimulation. The limits of linearity vary slightly among individuals but not between a subject's two eyes. G.R.

**A71-29033 Comparison of electrophoretic mobility of tear lysozyme in 50 subjects.** Mathea R. Allansmith, Daniel Drell, Robert P. Anderson, and Lawrence Newman (Stanford University, Stanford, Calif.). *American Journal of Ophthalmology*, vol. 71, Feb. 1971, p. 525-529. 7 refs. PHS Grants No. EY-00445; No. EY-0051; NSF Grant No. 6 W-2200.

No difference was found in the mobility of lysozyme from tears of 50 persons. Tears from several animal species were also examined. Only in monkey could protein be detected. The two species of monkeys examined had a difference in the migration of their tear lysozyme both from each other and from the human. It is concluded that the rareness or absence of a difference in electrophoretic mobility of tear lysozyme in humans makes this technique not useful as a screening marker for genetic studies. G.R.

**A71-29034 Iris mechanics. II - Influence of pupil size on details of iris structure.** David A. Newsome and Irene E. Loewenfeld (Presbyterian Hospital; Columbia University, New York, N.Y.). *American Journal of Ophthalmology*, vol. 71, Feb. 1971, p. 553-573. 31 refs. Research supported by the Harriman Fund; PHS Grants No. NB 00253; No. K3-NB-16,542.

The influence of pupil size on the surface area and the radius of an inner (pupillary) and an outer (ciliary) iris ring marked off by the outline of the collarette was investigated. In addition the behavior of iris detail such as the size and shape of crypts, the course of blood vessels, the number and position of radial iris folds and of circular contraction furrows were studied over the range from very small to very large pupils. It was found that there are limits of linearity in the structural arrangements of the iris. The behavior of the structural iris detail at different pupil sizes does not support theories that propose an active role of the iris stroma in initiating or in aiding pupillary movements. Instead, these movements appear to be caused by the iris muscles alone, with the stroma carried along and adapting to the various changes. G.R.

**A71-29035 \* Preliminary report of biologic testing of laser protective materials.** S. Fine, D. MacKeen (Northeastern University; Massachusetts General Hospital, Boston, Mass.), J. W. Berkow, and B. S. Fine (U.S. Armed Forces Institute of Pathology; George Washington University, Washington, D.C.). *American Journal of*

*Ophthalmology*, vol. 71, Apr. 1971, p. 828-834. 7 refs. PHS Grants No. EY-00397; No. EY-00133; Contracts No. DA-49-193-2436; No. DA-49-193-2437; Grant No. NGR-22-011-007.

A series of filters having considerable attenuation at the ruby laser wavelength was evaluated as protective devices for the eye in short-term studies by using the sensitivity of *in vivo* ocular tissue response. The ability of the filter to protect the eye increased with increasing optical density at the laser wavelength, as expected. Compared with normal-mode irradiation, the relative hazard of Q-switched irradiation at suprathreshold levels is much greater than expected from threshold studies. G.R.

**A71-29036 \* Mechanical sterilization of the applanation tonometer. II.** John M. Corboy, Charles R. Goucher, and Carole A. Parnes (U.S. Public Health Service Hospital, San Francisco, Calif.). *American Journal of Ophthalmology*, vol. 71, Apr. 1971, p. 891-893. 8 refs. NASA Contract No. T-55346-G.

The tip of the Goldmann tonometer prism was dipped 2 mm into a suspension of T-2 coliphage. Phages adhering to the tip were counted by the agar layer method of Hershey et al. (1943). Mechanical methods of cleansing the prism were investigated. It was found that rinsing and wiping was virtually as effective in removing virus particles as prolonged germicidal immersion. Recommendations for cleansing applanation prisms are offered. It is emphasized that careful hand washing may be as important in preventing transfer of infection as cleaning the tonometer. G.R.

**A71-29096 \* Deleterious mutations and neutral substitutions.** Thomas H. Jukes (California, University, Berkeley, Calif.) and Jack Lester King (California, University, Santa Barbara, Calif.). *Nature*, vol. 231, May 14, 1971, p. 114, 115. 7 refs. NASA-NIH-supported research.

Discussion of a model which states that point mutations occur randomly in DNA, and therefore in proteins, but the adaptive process screens out deleterious mutations. Evolutionary replacements will therefore deviate from the Poisson distribution, but a certain partial or residual randomness is perceptible in such replacement when proteins which have considerable latitude for variation are studied. In spite of these reservations it is considered that Clarke's analysis (1970) is an interesting contribution to molecular evolution. F.R.L.

**A71-29113 Reaction mechanism of respiratory gases on potassium superoxide in closed circuit breathing apparatus (Mécanisme des réactions des gaz respiratoires sur le superoxyde de potassium, dans les appareils de respiration en circuit fermé).** H. Ducros, C. Laurent, and F. Joannes (Centre d'Essais en Vol, Brétigny-sur-Orge, Essonne, France). *Revue des Corps de Santé des Armées*, vol. 11, Dec. 1970, p. 887-903. 10 refs. In French.

Results of observations on samples of potassium superoxide in pellet form, some of which include a catalyst (copper oxychloride). This product, obtained by the action of hydrogen peroxide on KOH, has recently been used in cartridge form in a self-contained breathing apparatus. On these samples of potassium superoxide potassium oxide is titrated, and then the release of oxygen by the action of liquid water is measured. The action of water vapor on potassium oxide is studied in an apparatus fitted with an intermittent pump simulating the respiratory rhythm. This apparatus also serves to study the reactions of carbonic anhydride, whether pure or diluted, dry or humidified, on potassium superoxide. F.R.L.

**A71-29125 \* A possible basis for periodic arousals during hibernation - Accumulation of ketone bodies.** Joan Baumber, F. E. South, L. Ferren, and M. L. Zatzman (Missouri, University, Columbia, Mo.). *Life Sciences, Part II - Biochemistry, General and Molecular Biology*, vol. 10, Apr. 22, 1971, p. 463-467. 6 refs. Research supported by the University of Missouri; Grant No. NGR-26-004-025.

## A71-29143

Concentration of ketone bodies were studied during activity, deep hibernation and early arousal in marmots. The blood samples were obtained by sacrifice and by cannulation. The data from the cannulated animals indicated a rise in ketone bodies (all fractions) during hibernation. Samples obtained from the cannulated marmots also showed a fall in concentrations occurred during arousal. On the other hand samples obtained by direct sacrifice of hibernating marmots indicated a fall in the ketone concentrations occurred - possibly as a consequence of the irreducible trauma and required time of the manipulation. The data were interpreted as being not incompatible with the hypothesis that ketonemia could be a 'trigger' for the increased oxidative metabolism effecting arousal. (Author)

**A71-29143 # The education of aircraft personnel in the field of 'Aeronautical Operations Technology' at the Institute of Transportation 'Friedrich List'** (Die Ausbildung von Luftfahrtpersonal in der Fachstudienrichtung Luftfahrtbetriebstechnik der Hochschule für Verkehrsingenieur 'Friedrich List'). Fritz Seidler (Dresden, Hochschule für Verkehrswesen, Dresden, East Germany). *Technisch-ökonomische Informationen der zivilen Luftfahrt*, vol. 7, no. 4, 1971, p. 179-186. In German.

The total time of study for aircraft personnel at the Institute is four years. The education consists of two parts, each of two years' duration, involving basic general studies and studies of a specialized nature. An engineering degree (Diplom-Ingenieur) is awarded at the successful completion of the studies. Persons graduating are employed as aircraft pilots, engineers charged with flight safety or functions aboard the aircraft, and systems engineers in the INTERFLUG organization. G.R.

**A71-29145 # The radiation exposure of aircraft personnel because of radioactive luminous paint** (Die Strahlenbelastung des Flugzeugpersonals durch radioaktive Leuchtfarbe). Norbert Jakisch and Albert Mackenzan. *Technisch-ökonomische Informationen der zivilen Luftfahrt*, vol. 7, no. 4, 1971, p. 202-208. In German.

It is pointed out that instrument dials, signs and operational elements in an aircraft are covered with a radioactive luminous paint to ensure visibility under conditions of darkness. Aircraft personnel are, therefore, exposed to alpha particles, beta particles, gamma rays and bremsstrahlung. Additional hazards include a direct contact of a person with radioactive material in case of damage to the luminous layers and contamination of the air by gaseous radioactive decomposition products. Data of radiation exposure for members of the flying personnel of INTERFLUG are reported, and the methods used in the investigation are described. G.R.

**A71-29252 The protection of astronauts against solar flares.** P. M. Malton. *Spaceflight*, vol. 13, June 1971, p. 220-224. 27 refs.

Solar flares on the sun's surface result in the expulsion into space of protons of very high energy, known as solar cosmic rays. The solar cosmic rays constitute a very great and real danger to men in space. The motion of the particles is affected by magnetic fields which are partly supported by the solar wind. The biological effectiveness of cosmic radiation is examined giving attention to protection provided to astronauts by spacesuit, surrounding equipment and cabin walls. Spacecraft orientation can be an important factor in reducing radiation dose. Solid shielding, electrostatic shielding, magnetic shielding, and plasma shielding are discussed. Plasma shielding appears to be the most effective method if aspects of system mass are taken into consideration. The possibility to increase in some way the biological ability of an astronaut to tolerate radiation is briefly discussed. G.R.

**A71-29260 A calculation of neutron-induced physical doses in human tissues.** J. J. Ritts, M. Solomito, and P. N. Stevens (Oak Ridge National Laboratory, Oak Ridge, Tenn.). *Nuclear Technology*, vol. 11, June 1971, p. 246-258. 20 refs. AEC-sponsored research.

Improved multicollision neutron fluence-to-dose conversion factors have been calculated for a phantom exposed to neutrons with energies from 15 MeV down to thermal. The phantom was a 30-cm-thick slab composed of the 11 most common elements in the standard man. The calculations consisted of the simultaneous solution of the neutron and secondary gamma-ray transport problem with the ANISN computer code for both a beam source and an isotropic flux source, and for a slab having both infinite and finite transverse dimensions. The fluence-to-dose conversion factors were based on new neutron fluence-to-karma factors and improved secondary gamma-ray yields determined for the individual elements comprising the slab. The neutron and gamma-ray cross sections used in the calculations are from the ENDF/B file and the OGRE library, respectively. (Author)

**A71-29284 # Measurement procedures and range of application of the equivalent permanent sound level** (Messverfahren und Anwendungsbereich des äquivalenten Dauerschallpegels). H. Weissing. *Hochfrequenztechnik und Elektroakustik*, vol. 80, Feb. 1971, p. 14-22. 15 refs. In German.

The actual sound level at a location can show very pronounced irregular fluctuations. A noise exposure index Q is obtained by forming a mean value of the sound intensity measurable during a certain time interval. Equations for defining Q are based on the instantaneous values of sound intensity. However, there are inertia effects regarding the indication of sound level meters used in various methods for the determination of Q. Approaches for correcting the measured values are considered. The significance of the determination of Q for an evaluation of harmful effects on persons subjected to the noise is discussed. G.R.

**A71-29286 A quantitative approach to performance evaluation of man-machine systems having a stochastic environment.** C. L. Proctor, T. M. Khalid (Florida, University, West Palm Beach, Fla.), and C. C. Stueve (USAF, Tinker AFB, Okla.). *International Journal of Man-Machine Studies*, vol. 3, Apr. 1971, p. 127-140. 13 refs.

Demonstration of how knowledge from the engineering, biological, mathematical, and psychological fields may be combined to quantify some aspects of human behavior. A simulation algorithm was developed and studied which was based on quantitative data collected during tests in a jet-engine test facility. One feature of the model is its ability to predict the time expected to complete a particular task such as the completion of a jet-engine test. It is considered that simulation algorithms are one of the most effective means of performance measurement for time varying occurrence factors. F.R.L.

**A71-29289 \* # A superposition model of the spontaneous activity of cerebellar Purkinje cells.** N. H. Sabah and J. T. Murphy (New York, State University, Buffalo, N.Y.). *Biophysical Journal*, vol. 11, May 1971, p. 414-428. 43 refs. NIH Grant No. R 01NB0822101; Grant No. NGR-33-015-016.

Based on physiological evidence for multiple firing zones in the dendritic arborizations of cerebellar Purkinje cells, a superposition model is proposed for spike triggering in these cells. Spike trains from 10 Purkinje cells were analyzed in terms of independence of interspike intervals and the properties of their variance-time curves. The results of this analysis were found consistent with the hypothesis that the spike train of a cerebellar Purkinje cell is the pooled output of a relatively large number of independent component processes. Simplifying assumptions as to the statistical nature of these processes lead to a very rough estimate of the number of firing zones. (Author)

**A71-29300 Aerospace Medical Association, Annual Scientific Meeting, Houston, Tex., April 26-29, 1971, Preprints of Scientific Program.** Washington, D.C., Aerospace Medical Association, 1971. 275 p. Members, \$7.00; nonmembers, \$10.00.

The panel on clinical aerospace medicine includes papers dealing with life support, pharmacology and therapeutics, metabolism, and

cardiovascular fitness. Noise and vibration, hyperoxia, bioinstrumentation, weightlessness, and oxygen toxicity are considered, as well as pulmonary hyperbarics, acceleration, fatigue and circadian rhythms, vision, hypoxia and hypoglycemia, and radiobiology. One section is devoted to the duties of flight nurses, and is followed by papers dealing with thermal stress, habitability in space stations, behavioral sciences, flight safety, personnel selection, acceleration and restraint, and disorientation.

F.R.L.

**A71-29301 Aortic stenosis, sudden death, and the left ventricular baroreceptors.** A. M. Johnson (Southampton Chest Hospital, Southampton, England). *British Heart Journal*, vol. 33, Jan. 1971, p. 1-5. 21 refs. Translation.

Discussion of the magnitude and significance of the problem of sudden death in the presence of aortic valve stenosis. A new hypothesis for the mechanism of syncope and sudden death in this disease is suggested from evidence already existing in the cardiovascular, physiological, and pharmacological literature. It is suggested that observations marshaled in three studies may be accounted for by the presence of baroreceptors in the left ventricular wall, responsive to a severe rise of left ventricular systolic pressure and initiating a depressor reflex to produce bradycardia, peripheral systemic vasodilation, and dilation of the splanchnic bed. Diminished venous return with diminished cardiac output, together with lowered systemic vascular resistance, results in severe hypotension and syncope; coronary arterial blood flow falls abruptly in the face of heavy left ventricular work, and myocardial ischaemia causes angina if there is recovery from syncope, or arrhythmias cause final arrest of the circulation and death ensues.

M.M.

**A71-29302 Estimation of ventricular mass from the electrocardiogram.** O. Visioli, G. Malagnino, C. Majorano, and A. Chiarini (Parma, Università, Parma; Comitato Nazionale per l'Energia Nucleare, Centro di Calcolo, Bologna, Italy). *British Heart Journal*, vol. 33, Jan. 1971, p. 32-36. 13 refs.

In 101 cases post-mortem cardiac measurements were correlated with electrocardiographic parameters. Each of the 8 anatomical parameters examined gave significant regressions. The data concerning the left ventricle and the ratio between both ventricles were best represented, especially the per cent increase in left ventricular weight. Less valid were the equations relating to the right ventricle. This study indicates that some anatomical cardiac features may be quantitatively determined from electrocardiographic data. (Author)

**A71-29303 Influence of body position on exercise tolerance, heart rate, blood pressure, and respiration rate in coronary insufficiency.** Harry Lecero (Malmö General Hospital, Malmö, Sweden). *British Heart Journal*, vol. 33, Jan. 1971, p. 78-83. 28 refs. Research supported by the Swedish Medical Research Council.

The influence of body position on exercise tolerance, heart rate, systolic blood pressure, and breathing frequency was studied during bicycle exercise in 37 male patients with coronary insufficiency. With identical work loads before the onset of angina pectoris, the heart rate was significantly higher in the supine position. Exercise tolerance was lower in the supine position, and angina pectoris developed at a significantly lower heart rate and systolic blood pressure.

(Author)

**A71-29314 Study of local cutaneous heat regulation in man by the thermoconvectance method - Demonstration of a cooperative histamine-bradykinin method (Etude de la régulation thermique cutanée locale chez l'homme par la méthode de la thermoconvectance - Mise en évidence d'un mécanisme coopératif histamino-bradykinique).** M. Gautherie (Strasbourg, Université, Strasbourg, France). *Journal de Physiologie*, vol. 63, Jan.-Feb. 1971, p. 41-76. 58 refs. In French.

Use of the thermoconvectance method to study the local cutaneous vasodilatation and thermoregulation and their nervous and

humoral factors in man by measuring the variations of the cutaneous circulatory state as a function of the cutaneous temperature. The method consists in analyzing, by infrared thermometry and electronic computation, the response to the application of a thermode at constant temperature to a small cutaneous surface of some square centimeters. It was observed that only the vasoconstrictor sympathetic system played a part in the local cutaneous thermoregulation, and then only below 30°C. The humoral factors were analyzed by searching out vasodilator substances able to reproduce the cutaneous circulatory states corresponding to the thermoconvectance values measured under normal conditions. Only bradykinine fulfilled this condition.

F.R.L.

**A71-29315 Adrenocortical function during the annual cycle of a hibernant: The garden dormouse (Eliomys quercinus L.). II - Activity during autumn: Period of preparation for hibernation (Etude de la fonction corticosurrénalienne au cours du cycle annuel chez un hibernant: Le Lérot /Eliomys quercinus L./. II - Activité durant l'automne: Période de préparation à l'hibernation).** R. Bouloud (Muséum National d'Histoire Naturelle, Paris, France). *Journal de Physiologie*, vol. 63, Jan.-Feb. 1971, p. 77-86. 29 refs. In French.

Study of the plasma level and in vitro adrenal secretion of 17-hydroxy-corticosteroids and corticosterone, which parallel each other in the garden dormouse during autumn. With the approach of cold weather there is an increase in adrenocortical activity which becomes very important and then diminishes upon entry into hibernation. It appears that such activity prepares the animal for hibernation, and the factors relating this to variations in environmental temperature are discussed.

F.R.L.

**A71-29316 Apparatus making possible prolonged measurements of oxygen consumption ( $\dot{V}_{\text{O}_2}$ ), respiratory quotient (R), and insensitive perspiration in man (Montage permettant des mesures prolongées de la consommation d'oxygène / $\dot{V}_{\text{O}_2}$ / du quotient respiratoire /R/ et de la perspiration insensible, chez l'homme).** M. Apfelbaum, D. Lacatis, J. Bostsarron, A. Huot, M. Joliff, and F. Barcon (Hôpital Bichat, Paris, France). *Journal de Physiologie*, vol. 63, Jan.-Feb. 1971, p. 91-95. In French.

Description of equipment which is a simplification of the metabolic chamber. By use of two concentric enclosures not hermetically sealed, and with unilateral leakage, it is possible to reduce the cost price and simplify operation. It is possible to carry out measurements continuously for over 24 hr on freely moving subjects, who are thus able to feed themselves.

F.R.L.

**A71-29319 # Heart-rate variability in sleep and wakefulness.** J. A. Burdick, G. Brinton, L. Goldstein, and M. Laszlo (Manitoba University, Winnipeg, Manitoba, Canada; Amherst College, Amherst, Mass.; Bureau of Research in Neurology and Psychiatry, Princeton, N.J.). *Cardiology*, vol. 55, no. 2, 1970, p. 79-83. 9 refs. Research supported by the Manitoba Alcoholism Foundation; PHS Grant No. FR-05558.

The EKGs of eight normal males were recorded during the wakeful state, rapid-eye-movement (REM) sleep, and stage 4 sleep. The coefficient of temporal variability (CVT) was calculated twice for each individual in each of the three states. A test-retest correlation for reliability of the CVT values was also calculated. Heart-rate variability was found to be much higher in stage REM sleep than in the wakeful state or stage 4 sleep, and variability did not seem to be a measure of arousal. The lack of test-retest reliability found in the wakeful state suggests that the CVT reflects the response of the organism to uncontrolled environmental changes.

M.M.

**A71-29320 # Hemodynamic response to exercise after beta-adrenergic blockade in normal and labile hypertensive patients.** L. E. Folle, J. Dighiero, I. Sadí, C. Pommerenck, and R. Elena (Uni-

## A71-29325

versidad de la Repùblica, Montevideo, Uruguay). *Cardiology*, vol. 55, no. 2, 1970, p. 105-113. 14 refs.

In labile hypertensive patients, the changes in diastolic and mean blood pressure, left ventricular work, and left ventricular stroke work were more pronounced than in normal subjects. After beta-adrenergic blockade, there was no longer a significant difference between the two groups. Moreover, the response of labile hypertensive patients after blockade was quite similar to the response of the control group in normal conditions. The pharmacologic agent used, Trasicor, did not limit the increase in cardiac output during exercise in the normal group. Its effect seems to be due mainly to a negative chronotropic action. M.M.

**A71-29325 Biomedical aspects of microwave exposure.** Sol M. Michaelson (Rochester, University, Rochester, N.Y.). *American Industrial Hygiene Association Journal*, vol. 32, May 1971, p. 338-345. 47 refs.

The attempt is made to review the present state of knowledge on biologic effects of microwaves and to set apart known and substantiated effects from speculative and unsubstantiated ones. An adequacy reappraisal of the originally proposed (1953) safety standard of 10 mW/sq cm, many times questioned since, leads to the conclusion that there is little reason to require modification of this standard. M.V.E.

**A71-29326 Intramodal and crossmodal sensory transfer of visual and auditory temporal patterns.** Leo Rubinstein and Ernest M. Gruenberg (Columbia University, New York, N.Y.). *Perception and Psychophysics*, vol. 9, May 1971, p. 385-390. 17 refs. PHS Grants No. MH-08609-05; No. MH-08609-06.

Temporal pattern perception for vision and audition was measured using pair comparisons of precisely determined rhythms as test items. Visual rhythms were more difficult to match than were comparable auditory ones. Crossmodal transfer equaled intramodal transfer in one experiment but was inferior in another. The differences between intra- and crossmodal transfer were related to the frequency of pattern elements, with crossmodal performance decreasing more when frequency rose. The nine test items showed a consistency in relative difficulty across experimental conditions. Differences in item difficulty were related to the symmetry of the first pattern in the item. (Author)

**A71-29327 \* Power laws for the perception of rotation and the oculogyral illusion.** William Elsner (San Jose State College, San Jose, Calif.). *Perception and Psychophysics*, vol. 9, May 1971, p. 418-420. 17 refs. Grant No. NGL-05-046-002.

Magnitude estimation was used to measure subjective motion for two indicators of vestibular motion, the perception of rotation in the dark (POR) and the oculogyral illusion (OGI). The results obtained warrant the statement that Stevens's (1957) power law provides an excellent description of the relationship of subjective vestibular sensation to stimulus pulses of angular acceleration. In addition, the subjective changes in sensation for the OGI and the POR at suprathreshold levels are similarly mediated psychophysiological processes with only a small degree of divergence. M.V.E.

**A71-29345 \* Electroencephalographic and evoked potential correlates of reaction time and visual discrimination performance.** Charles J. Morris (Denison University, Granville, Ohio). *Psychonomic Science*, vol. 23, May 10, 1971, p. 193-195. 9 refs. NASA-supported research.

Electroencephalographic (EEG) and evoked cortical potential (ECP) measures of arousal were found to be related to level of performance on a reaction time and visual discrimination task. ECP measures were more strongly associated with performance on both tasks than any of the EEG measures. However, the very weak association between arousal measures and visual discrimination

performance suggested that arousal plays a limited role in the control of complex decision processes. (Author)

**A71-29350 Optics for the airborne observer.** Lewis Larmore (Douglas Advanced Research Laboratories, Huntington Beach, Calif.) and Freeman F. Hall, Jr. (NOAA, Environmental Research Laboratories, Boulder, Colo.). *SPIE Journal*, vol. 9, Feb.-Mar. 1971, p. 87-94. 7 refs.

This paper describes and explains with illustrations many of the interesting optical effects frequently observed by an air traveler. During the take-off phase, haze or clouds render the effects of the disturbed air visible and allow the observer to see the scattering which results from small particles. At level flight, cloud droplet scattering differentiates between large and small particle effects. In addition, the colored halos known as 'the glory' form interesting patterns as they dart among the clouds. During periods of clear weather, the heiligenchein frequently follows the end point of condensation trails. Polarized sky-light leads to some unusual results when the observer is wearing dark glasses made of a polarizing material. Many other optical effects including shock-wave shadows, shallow-water colors, and the twilight wedge all result from the unique perspective obtained from the aerial vantage point of the air traveler. (Author)

**A71-29352 \* Fatty acid ethyl esters of Rhizopus arrhizus.** John L. Laseter (Louisiana State University, New Orleans, La.) and John D. Weete. *Science*, vol. 172, May 21, 1971, p. 864, 865. 17 refs. Research supported by the Research Corp.; Contract No. NSR-09-051-001.

Gas chromatographic and mass spectrometric analyses on selected lipid fractions revealed for the first time the presence of ethyl esters of long-chain fatty acids as biological products. Ethyl esters of oleic, palmitic, and stearic acids were detected in relative concentrations of 21.2, 2.4, and 1.5 per cent, respectively, of the total methyl and ethyl ester fraction. Both saturated and unsaturated ethyl esters contain pronounced mass spectral fragments at a mass-to-charge ratio of 88. (Author)

**A71-29353 \* Visual phenomena noted by human subjects on exposure to neutrons of energies less than 25 million electron volts.** Thomas F. Budinger, Cornelius A. Tobias (California, University, Berkeley, Calif.), and Hans Bichsel (Washington, University, Seattle, Wash.). *Science*, vol. 172, May 21, 1971, p. 868-870. 10 refs. NASA-supported research; PHS Grant No. CA-12446.

Six subjects reported multiple starlike flashes and short streaks on exposure to neutrons of energies up to 25 million electron volts. The probable mechanism is interaction with the retinal rods by proton recoils and by alpha particles released from neutron reactions with carbon and oxygen. These observations are similar to light flashes and streaks seen by astronauts who are exposed to high-energy cosmic rays on translunar flight. (Author)

**A71-29358 Changes in the elimination of xenon-133 from the anterior tibial muscle in man induced by immersion in water and by shifts in body position.** U. I. Balldin, C. E. G. Lundgren, J. Lundvall, and S. Mellander (Lund, University, Lund, Sweden). *Aerospace Medicine*, vol. 42, May 1971, p. 489-493. 17 refs. Research supported by the Swedish Medical Research Council and the Delegation for Applied Medical Defense Research.

The elimination of Xe-133 from a deposit in the anterior tibial muscle was studied in sitting human subjects under dry conditions and during water immersion to heart level. Studies were made both during air and oxygen breathing. In a supplementary study, the rate of Xe-elimination from the same muscle was recorded in erect and supine body position. Immersion led to an increase of Xe-clearance above that during dry conditions, averaging 130% during air breathing and 103% during oxygen breathing. Xe-clearance in supine

position exceeded that in the erect position by 102%. These effects may reflect corresponding increases of muscle blood flow. Increased functional capillary surface area possibly also contributed to the enhanced Xe-elimination.  
(Author)

**A71-29359 \*** MITNYS - A hybrid program for on-line analysis of nystagmus. John R. Tole and Laurence R. Young (MIT, Cambridge, Mass.). *Aerospace Medicine*, vol. 42, May 1971, p. 508-511. 5 refs. Grant No. NGR-22-009-156.

A computer program, MITNYS, has been developed for on-line analysis of nystagmus during closed loop experiments involving visual and/or vestibular function. The program accepts voltage records of eye position and yields cumulative slow phase position and continuous slow phase velocity nearly instantaneously. The slow phase velocity is obtained by differentiating the calculated cumulative position rather than the raw eye movements. While intended primarily for experimental work, the program is also useful as a data reduction tool. The algorithm is discussed in some detail. It can be implemented on a hybrid computer or a small digital computer with 2 channels each of analog to digital and digital to analog converters. An example of a vestibular nystagmus record processed with MITNYS is included.  
(Author)

**A71-29360 \*** Nutritional and hormonal aspects of the oxygen toxicity syndrome. H. A. Leon, G. A. Brooksby, M. J. Chackerman, and R. W. Staley (NASA, Ames Research Center, Moffett Field, Calif.). *Aerospace Medicine*, vol. 42, May 1971, p. 512-517. 24 refs.

Rats were exposed to pure oxygen continuously for 28 days at pressures from 197 to 760 mm Hg. Food consumption, growth, food efficiency utilization and a number of biochemical parameters were determined and compared to control rats given an amount of food equal to that consumed by the oxygen-exposed rats. Most criteria indicated a maximum at an exposure pressure of 450 mm Hg. At pressures above this, food consumption, growth, food efficiency utilization, and the levels of plasma protein-bound iodine and insulin were significantly depressed. Plasma glucose and corticosterone as well as the capacity of liver preparations to incorporate amino acids, a measure of liver protein synthesis, showed similar trends. The results suggest that the changes noted in the specific parameters were not directly due to oxygen but were more related to the effect that oxygen or other conditions of the confinement have on the appetite, the changes observed being a direct result of the altered food intake.  
M.M.

**A71-29361 \* #** Body fat, denitrogenation and decompression sickness in men exercising after abrupt exposure to altitude. T. H. Allen, D. A. Maio, and R. W. Bancroft (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aerospace Medicine*, vol. 42, May 1971, p. 518-524. 51 refs. USAF-supported research; NASA Contracts No. T-57919-G; No. T-82170.

Groups of men, numbering 147 in all, among whom body volume and mass had been determined took 883 exposures for as long as 4 hours at 35,000 ft in oxygen or 27,000 ft in oxygen or in 70:30:oxygen:nitrogen while performing mild intermittent exercise. Forty men with less than 12 kg of body fat suffered a low incidence of less intense decompression sickness than the 107 men with 12 or more kg of body fat. This distinction as to influence of body fat on decompression sickness applied both in the absence and in the presence of denitrogenation for periods up to 3.5 hours when completely exposed in 'shirtsleeves' to oxygen at 'ground level.' After 4 hours of such denitrogenation 99% were protected including those with more than 12 kg of fat.  
(Author)

**A71-29362** Pulmonary oxygen toxicity - Composition of endobronchial saline extracts of rats during exposure to oxygen. Juha Niinikoski, Tapio Nikkari, and Eino Kulonen (Turku University, Turku, Finland). *Aerospace Medicine*, vol. 42, May 1971, p.

525-529. 21 refs. Research supported by the Research Council for Medical Sciences of Finland and the Sigrid Jusélius Foundation.

This study was made in rats by exposing them to 90-95 per cent oxygen at one atmosphere for 24, 48, or 72 hr. Progressive respiratory distress and pulmonary edema developed within 48 hr of breathing oxygen, and 30 per cent of the rats died by the third day. Dry weight of the lung increased linearly during exposure to oxygen. Pulmonary surfactant was extracted by endobronchial washing with saline. During the first two days of oxygen inhalation the composition of phospholipids in the extract was normal, but during the third day an unusual phospholipid, tentatively identified as a phosphatidyl dimethylethanolamine, appeared in the thin-layer chromatograms. No lipid peroxides were observed in the surfactant during breathing of oxygen. When pulmonary edema occurred, a simultaneous increase was noticed in the amounts of deoxyribo nucleic acid, lipid phosphorus, protein, nitrogen, and hexosamines in the endobronchial extracts. The most sensitive indicators of oxygen-induced pulmonary damage were the amounts of collagen hydroxyproline and uronic acids, which increased sharply after 24 hr of oxygen breathing.  
M.M.

**A71-29363 #** Psychobiologic effects of prolonged bed rest (weightless) in young, healthy volunteers (Study II). Ralph S. Ryback, Oliver F. Lewis, and Charles S. Lessard (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aerospace Medicine*, vol. 42, May 1971, p. 529-535. 53 refs. USAF-sponsored research.

Sleep data, including EEG recording, psychological testing, and psychomotor performance, were obtained from 8 young, healthy men subjected to prolonged bed rest. The study was divided into control, experimental (bed rest), and recovery phases of 5, 5, and 6 weeks, respectively. During the bed rest period, 4 subjects continued to exercise while the remainder acted as controls (without exercise). With the onset of bed rest an increase in deep sleep (Stages 3 and 4) and a decrease in light sleep (Stages 1 and 2) were observed especially in the nonexercise group. An additional or ninth subject was recorded while napping during the day and it was shown that napping decreased the amount of time spent in deep sleep that night relative to control nights. Psychological testing revealed an increase in anxiety, hostility and depression just in anticipation of being put to bed and psychomotor testing demonstrated a decrease in handgrip in the nonexercise group during bed rest. The implications of these findings for the practicing physician are discussed.  
(Author)

**A71-29364 #** CO<sub>2</sub> narcosis in the rat. I - Effects on respiration and blood parameters. II - Effects on the ECG. W. Clayton Petty (Brooke General Hospital, Fort Sam Houston, Tex.) and T. S. Sulkowski (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aerospace Medicine*, vol. 42, May 1971, p. 547-558. 66 refs.

The effects of hypercapnia were studied in the rat at concentrations ranging from 5 to 70% CO<sub>2</sub> in 22% O<sub>2</sub>. Respiratory parameters of tidal volume, respiratory rate, and minute volume were measured during a 20-min exposure period. Blood gases, pH, hematocrit, and percent oxyhemoglobin saturation were measured at the end of the exposure period. The results indicate that hypercapnia in narcotic concentrations increases minute volume by increasing tidal volume. A quadratic relationship was found between pH depression and inspired CO<sub>2</sub> levels. A linear relationship was found between percent oxyhemoglobin saturation and inspired CO<sub>2</sub> levels in the presence of normal arterial blood oxygen tensions. A rise in hematocrit was noted and found to have a linear relationship to the percent CO<sub>2</sub> exposure mixture.  
M.M.

**A71-29365** Cerebral dysfunction as a cause of pilot failure during training or operational flight. G. J. Kidera, C. R. Harper, and J. F. Cullen (United Air Lines, Inc., Chicago, Ill.). *Aerospace Medicine*, vol. 42, May 1971, p. 559-563. 7 refs.

The functions of the cerebral cortex differentiate human beings from other animals. It is difficult to estimate the incidence of

## A71-29366

minimal cerebral cortical dysfunction. No single etiologic factor exists for transient or permanently altered mental functions. Statistical estimates are based on persons who have demonstrated obvious and gross psychological deficits. Detection of early symptoms can be effectively clouded due to compensation and/or rationalization by the patient, his relatives, and peers. The following summaries are examples of cases over a fifteen month period in which aviators failed in flight training or experienced significant difficulty in maintaining adequate operational skills. These persons were in the category of those who had received maximal training and tutoring in helping them achieve the required proficiency. (Author)

**A71-29366 Detection of alcohol in aviation and other fatalities in Finland.** Antti R. Alha and Veikko Tamminen (Helsinki, University, Helsinki, Finland). *Aerospace Medicine*, vol. 42, May 1971, p. 564-568. 18 refs.

Alcohol examinations on autopsy cases in 1970 and on 41 pilots and others who died in aviation accidents between 1961 and 1970 are presented. The samples had been taken less than 5 days in ca 80% of the cases. For determination of alcohol in the blood the Widmark and ADH methods were used side by side and the criterion of the primary interpretation of the results was the correspondence or discrepancy between the two results. Gas-chromatography was used for further investigation. According to possibilities and need, an alcohol examination was also performed on urine or organs. The battery of alcohol examinations offered good possibilities for interpreting the results as regards the presence of ethanol as either negative, positive or complicated. In complicated cases (10%), either exogenous volatile agents other than ethanol or an evident putrefaction effect were detected. In cases of putrefaction, the time elapsed between death and the taking of the sample as well as special conditions were significant. For the purpose of avoiding these factors, samples should be taken as early as possible. As regards the results of examinations, the aviation fatalities did not differ from the rest of the series. In the aviation fatalities, 5 pilots and others in 3 aircraft accidents could be shown to have had ethanol in their blood, although in one of these there was no evidence of alcohol ingestion in the case report. (Author)

**A71-29367 Roentgenological aspects in the examination of paranasal sinuses in aviators.** Istvan Simonyi. *Aerospace Medicine*, vol. 42, May 1971, p. 569-571. 10 refs.

The author surveyed the paranasal roentgenograms of 100 aviators serving in civil aviation for at least seven years. Infection of the facial cavities was prevalent. There was no relation between the incidence and degree of infection and the time spent in service. Circumstances of civil aviation in the role of the pilots' tasks in the development of sinusitis is not necessarily general or exclusive. On the other hand inflammatory conditions of the paranasal sinuses may represent a predisposing factor for the barotraumatic damage of sinuses. The examination in an altitude chamber is a sensitive method for the functional evaluation. From the point of view of prevention the medical examination before takeoff is important. (Author)

**A71-29399 Electrocardiogram recording with pasteless electrodes.** George E. Bergey, Russell D. Squires, and William C. Sipple (U.S. Naval Material Command, Naval Air Development Center, Warminster, Pa.). *IEEE Transactions on Bio-Medical Engineering*, vol. BME-18, May 1971, p. 206-211. 21 refs.

Experimentation regarding various aspects of a technique for recording electrocardiographic potentials from unprepared skin, without the use of conventional paste, is described. Because of the relatively high skin-to-electrode impedances encountered without electrolytic paste, high input impedance amplifiers must be utilized for acquisition of the signal. In order to minimize susceptibility to external electrostatic and electromagnetic interference, an inherent problem with high input impedance amplifiers, buffer amplifiers were incorporated directly within the electrode housing. Of the

different metals tested, stainless steel proved to be the most stable skin contact material for pasteless operation. The integrated electrode-buffer amplifiers described comply with specifications of the American Heart Association and should prove useful as a direct replacement for conventional paste-type electrodes in existing clinical EKG equipment as well as for long-term applications such as space missions and intensive-care unit patient monitoring, where frequent attention to the electrodes is inconvenient. (Author)

**A71-29400 \*** *A review on mathematical models of the human thermal system.* Liang-Tseng Fan, Fu-Tong Hsu, and Ching-Lai Hwang (Kansas State University of Agriculture and Applied Science, Manhattan, Kan.). *IEEE Transactions on Bio-Medical Engineering*, vol. BME-18, May 1971, p. 218-234. 36 refs. Grant No. NGR-17-001-034; Contract No. AF 44(620)-68-0020.

Several models based on theories of thermodynamics and transport processes, often referred to as mathematical or mechanistic models, as described in the literature, are reviewed in detail. The models are classified as follows: steady-state and unsteady-state models for a single element of the body; steady-state and unsteady-state models for the entire human body; and models which incorporate the human thermal systems and the external regulation devices. A brief evaluation of the systems is presented. O.H.

**A71-29442 # Visual-perception models.** G. H. Kornfeld and W. R. Lawson (U.S. Army, Night Vision Laboratory, Fort Belvoir, Va.). *Optical Society of America, Journal*, vol. 61, June 1971, p. 811-820. 24 refs.

Several theoretical models for the prediction of liminal contrast are studied. One model that employs the known excitation and inhibition spread functions of the eye accurately predicts, at 10 mL, thresholds for circular targets, sine waves, and rectangles, including the line as a special case. Sem empirically, this model is extended to include thresholds at low light levels. (Author)

**A71-29475 \* Circadian rhythm of leaves of Phaseolus angularis plants grown in a controlled carbon dioxide and humidity environment.** D. K. Alford and T. W. Tibbitts (Wisconsin, University, Madison, Wis.). *Plant Physiology*, vol. 46, 1970, p. 99-102. 11 refs. NASA-supported research.

Rhythmic circadian movements and irregular short period movements of the leaves were recorded as the leaves unfolded and developed. The mean period in rhythmic circadian movement was 27.3 hr with no significant differences in period between plants of the same or different experiments. The leaf movements of separate plants were not closely synchronized. It is suggested that leaf movement rhythms originate spontaneously within the plant. Z.W.

**A71-29476 \* Endogenous short period rhythms in the movements of unifoliate leaves of Phaseolus angularis Wight.** D. K. Alford and T. W. Tibbitts (Wisconsin, University, Madison, Wis.). *Plant Physiology*, vol. 47, 1971, p. 68-70. 14 refs. Grant No. NGR-50-002-109.

Rhythmic rotational movements with the midvein as the axis were observed in the unifoliate leaves of Phaseolus angularis Wight grown under controlled environmental conditions with continuous light. The mean period of this movement for all leaves was 53.2 plus or minus 4.3 minutes and remained constant as the leaf matured, except after removal of the apical meristem and emerging trifoliate leaf when the period increased by about 5 minutes. The amplitude of the movement also remained constant as the leaf matured. Z.W.

**A71-29480 \* Immunochemical studies on pepsinogens A, C and D from the smooth dogfish, *Mustelus Canis*.** Terrence G. Merrett, Lawrence Levine (Brandeis University, Waltham, Mass.), and Helen

van Vunakis. *Immunochemistry*, vol. 8, 1971, p. 201-209. 24 refs. NSF Grant No. GB-4302; Grant No. NGR-22-005-001.

Rabbit antibodies to pepsinogens A, C, and D (isolated from the gastric mucosae of the smooth dogfish) were characterized by immunodiffusion, immunoelectrophoresis, complement fixation and ability to inhibit enzymic activity of the pepsin formed from each zymogen. Similarities were detected only between pepsinogens A and D; pepsinogen C was unrelated to these proteins. The incubation of each pepsin with the antibody specific for its zymogen resulted in loss of enzymic activity indicating that the enzyme can bind to the antizymogen sera.

Z.W.

**A71-29491 Optimal regulation of respiratory airflow.** S. M. Yamashiro and F. S. Grodins (Southern California, University, Los Angeles, Calif.). *Journal of Applied Physiology*, vol. 30, May 1971, p. 597-602. 19 refs. NIH Grant No. GM-16437.

The hypothesis that the mechanical respiratory system is regulated in a way which minimizes work required to produce a given level of ventilation is explored. This hypothesis was tested by analytically predicting optimal airflow patterns and comparing these to experimentally measured patterns reported in the literature. Good agreement was found with animal patterns and human patterns observed under stress conditions. Human airflow patterns at rest cannot be predicted by this hypothesis. Instead, a criterion of minimum mean-squared volume acceleration was found to predict airflow patterns which closely match the resting human pattern. The criterion of minimum mean-squared volume acceleration is felt to be important, in connection with gas transport efficiency and ventilation-perfusion.

(Author)

**A71-29492 A bloodless method for measurement of diffusing capacity of the lungs for oxygen.** Gunnar J. Rosenhamer, Wolfgang O. Friesen, and Malcolm B. McIlroy (California, University, San Francisco, Calif.). *Journal of Applied Physiology*, vol. 30, May 1971, p. 603-610. 22 refs. NIH Grant No. HE-06285.

The diffusing capacity of the lungs for oxygen was determined in 10 normal male subjects during the combined stresses of severe exercise and short-term alveolar hypoxia. Alveolar oxygen tension was measured by a fast responding oxygen partial pressure electrode. The end-capillary oxygen saturation corresponding to a given alveolar oxygen partial pressure between 45 and 75 mm Hg was estimated from the deflection of an ear oximeter, the deflection having been corrected for the transfer characteristics of the circulation between the pulmonary capillaries and the ear. To calibrate the oximeter, the resting supine subjects breathed a low oxygen mixture, and the fall in saturation corresponding to a given oximeter deflection was calculated from the fall in alveolar oxygen partial pressure. The validity of this method of calibrating the ear oximeter was checked in 10 normal subjects. Significant alveolar to end-capillary oxygen partial pressure differences were found only at high work loads. The corresponding values of the diffusing capacity of the lungs for oxygen averaged 77.1 ml/min per mm Hg.

O.H.

**A71-29493 Interrelationships of factors affecting pulmonary diffusing capacity.** Gail H. Gurtner (Mayo Clinic and Mayo Foundation, Rochester, Minn.) and Ward S. Fowler (Johns Hopkins University, Baltimore, Md.). *Journal of Applied Physiology*, vol. 30, May 1971, p. 619-624. 25 refs. NIH Grant No. HE-3558.

The effects of position, exercise, and lung volume on the diffusing capacity of the lung for CO (DI), as measured by three different methods, were studied in three normal men. In the supine position at rest or in the erect and supine positions during exercise, DI was a function of lung volume (Va) alone and increased as lung volume increased. Under these circumstances, the distribution of DI with respect to Va appeared to be uniform, and the increase in DI was due chiefly to an increase in the membrane component (Dm), with capillary volume remaining nearly constant at increasing lung volume; the pulmonary capillaries probably were maximally filled. In the erect position at rest, DI did not increase greatly with lung

volume but, at any large lung volume, DI increased with exercise. In the erect position at rest, DI/Va ratios appeared to be nonuniform. In this condition, the pulmonary capillaries probably were partially empty. The distribution of DI and of pulmonary blood flow appear to be related.

(Author)

**A71-29494 Shift of the O<sub>2</sub>-Hb dissociation curve at altitude - Mechanism and effect.** C. Lenfant, J. D. Torrance, and C. Reynafarje (Washington, University, Seattle, Wash.; Lima, Universidad Nacional Mayor de San Marcos, Lima, Peru). *Journal of Applied Physiology*, vol. 30, May 1971, p. 625-631. 41 refs. PHS Grants No. HE-12174; No. AM-5130; AEC Contract No. AT (45-1)-2048.

The effect of the numerous interrelated changes occurring in blood upon exposure to altitude on the affinity of hemoglobin for oxygen was studied. For this purpose, oxygen dissociation curve and oxygen transport parameters were investigated in four normal subjects and in two subjects made acidotic with acetazolamide before, during, and after a sojourn of four days at an altitude of 4509 m. In the normal subjects the oxygen dissociation curve shifted rapidly to the right upon ascent. This shift appeared to be mediated by an increase in the concentration of 2,3-diphosphoglycerate (2,3-DPG). The change in 2,3-DPG was related to the increase in plasma pH above normal sea-level value experienced by the subjects. The subjects made acidotic before ascent had no significant increase in pH above normal. Also, their 2,3-DPG did not increase, nor did their curve shift at altitude. The 2,3-DPG seems to affect the affinity of hemoglobin for oxygen both by direct action (binding) and by lowering the intracellular pH (Bohr effect), and to be the most potent mechanism regulating the oxygen affinity.

O.H.

**A71-29495 Oxygen debt in short-term exercise with concentric and eccentric muscle contractions.** H. G. Knutten and K. Klausen (Copenhagen, University, Copenhagen, Denmark). *Journal of Applied Physiology*, vol. 30, May 1971, p. 632-635. 26 refs. Research supported by the Rask-Ørsted Foundation.

A comparison of various physiological responses (VO sub 2, heart rate, pulmonary ventilation, muscle blood flow) was made between work with concentric (W sub con) and eccentric (W sub ecc) muscle contractions. Four human subjects participated in experiments cycling on a treadmill for 3 and 6 min at intensities equated by the elicited oxygen uptake responses (approximately 1 L/min). Little or no oxygen deficit was observed in the beginning of W sub ecc. Oxygen debt values were similar, although there was a tendency for debts to be larger after 6 min exercise in W sub con and lower after 6 min of W sub ecc. Heart rate, pulmonary ventilation, muscle blood flow, and respiratory exchange ratio depended on or corresponded more closely to the aerobic energy release than the work performed. Additional support is given the concept that muscle cells are able to accept energy during W sub ecc either for direct employment in the contractile processes or for resynthesis of energy-yielding compounds.

(Author)

**A71-29496 Cardiac outputs during maximum effort running and swimming.** Robert W. Dixon, Jr. and John A. Faulkner (Michigan, University, Ann Arbor, Mich.). *Journal of Applied Physiology*, vol. 30, May 1971, p. 653-656. 17 refs. Research supported by the Michigan Heart Association.

Our purpose was to compare the cardiac outputs of trained college swimmers and recreational swimmers during tethered swimming and treadmill running. The cardiac outputs were estimated by a CO<sub>2</sub> rebreathing method. The tethered-swimming test consisted of two to four 3-min swims at increasing work loads. The last work load was the maximum weight the swimmer could support for 3 min. The treadmill-running test consisted of 5-min runs at 7 mph up to the maximum grade the subject could tolerate. At maximum work the cardiac output (30 L/min) and the maximum oxygen consumption (4.1 L/min) of the six trained swimmers were not significantly different swimming compared to running. The maximum oxygen consumption of the six recreational swimmers was 25% lower

**A71-29497**

swimming (2.7 L/min) than running (3.6 L/min). The decrease in the maximum oxygen consumption of the recreational swimmers was due completely to the decrease in cardiac output from 23 to 17 L/min. As previously reported, the trained swimmers tended to hypoventilate with a high O<sub>2</sub> extraction and a high expired CO<sub>2</sub>.

(Author)

**A71-29497** **Mechanical consequences of airway smooth muscle relaxation.** Arend Bouhuys and Karel P. van de Woestijne (Yale University, New Haven, Conn.). *Journal of Applied Physiology*, vol. 30, May 1971, p. 670-676. 22 refs. PHS Grants No. AP-00463; No. UI-00435.

We measured lung volumes, airway conductance (Gaw), maximum expiratory flow-volume (MEFV) curves, isovolume pressure-flow (IVPF) curves, and static lung recoil curves in healthy volunteers before and after inhalation of a bronchodilator drug. On the average, Gaw at 50% VC increased 34.7%, Gaw/TGV ratio increased 33.9%, maximum expiratory flow at 50% VC 9.0%, and FEV sub 1.0 3.6%. TLC, VC, peak expiratory flow, and static lung recoil pressure did not change significantly. In a few subjects, maximum flows on IVPF curves decreased slightly after bronchodilation. These results fit the hypothesis that bronchodilation renders large airways more compressible in man in vivo. This limits flow increase during forced expiration and may even result in decreased flows. The increased Gaw during panting reflects increased airway caliber which results from relaxation of tone when transmural stresses are low. Our results suggest that normal airway smooth muscle tone in man may help large airways to withstand dynamic compression during forced expirations.

(Author)

**A71-29498** **Influence of acclimatization on sweat sodium concentration.** J. R. Allan and C. G. Wilson (RAF, Institute of Aviation Medicine, Farnborough, Hants., England). *Journal of Applied Physiology*, vol. 30, May 1971, p. 708-712. 16 refs.

Experiments were undertaken to clarify the effects of heat acclimatization on the sodium concentration of sweat and to distinguish these from the effects of concomitant changes in sweat rate. Sweat samples were collected at different rates of sweating from three unacclimatized subjects, using a Perspex capsule containing filter papers. The subjects were then acclimatized to heat, using a passive hyperthermia technique, and a further series of sweat samples obtained at different rates of sweating. The weighed samples were analyzed for sodium concentration and the results used to plot sodium concentration against sweat rate before and after acclimatization. The results show significant reduction in sweat sodium concentration with acclimatization over a wide range of sweat rates. Possible mechanisms are discussed.

(Author)

**A71-29499** **Surface electromyography during sustained isometric contractions.** Andree J. Lloyd (U.S. Army, Medical Research Laboratory, Fort Knox, Ky.). *Journal of Applied Physiology*, vol. 30, May 1971, p. 713-719. 16 refs.

Ten male volunteers were asked to maintain isometric contractions involving elbow flexor muscles as long as possible at levels equal to 30, 50, and 70% of their maximum voluntary strength and to report when they experienced five successive levels of pain resulting from the contraction. Surface electromyographic recordings were made on the biceps muscle as well as three peripheral muscles. The results indicated that the maximum duration of the contraction could be reliably predicted from the reports of mild and moderate pain intensities. A frequency analysis of the EMG demonstrated that during a sustained contraction amplitude increase resulted from an increase in the activity within a narrow low-frequency band. The amplitude change was proposed to result from loss of motor units with a high-frequency rate of firing and a recruitment of units with a lower rate. The process was suggested to result in the typical synchronization of the EMG with accompanying onset of tremors associated with fatigue.

(Author)

**A71-29500** **Metabolic and cardiorespiratory response during free swimming and treadmill walking.** William D. McArdle, Roger M. Glaser, and John R. Magel (Queens College, Flushing, N.Y.). *Journal of Applied Physiology*, vol. 30, May 1971, p. 733-738. 23 refs.

The oxygen consumption and telemetered heart rate and ventilatory response were studied by subjecting five young trained swimmers to discontinued swimming and walking tests. Oxygen consumption was essentially linearly related to work intensity in these tests. For any level of oxygen consumption within the range measured, the heart rate during swimming averaged 9-13 beats/min lower than that during walking. At oxygen consumption above 2.0 liters/min, breathing frequency was approximately the same in both tests. Oxygen uptake at submaximal work levels was also quite similar. However, the maximum oxygen uptake and breathing rate were significantly higher in walking than in swimming. During submaximal work, oxygen extraction was generally higher in swimming with respiratory exchange ratio lower in swimming throughout the entire range of work. The energy cost of swimming at various speeds is presented in relation to previously reported data.

O.H.

**A71-29501** **Rate of development of pulmonary O<sub>2</sub> toxicity in man during O<sub>2</sub> breathing at 2.0 Ata.** J. M. Clark and C. J. Lambertsen (Pennsylvania University, Philadelphia, Pa.). *Journal of Applied Physiology*, vol. 30, May 1971, p. 739-752. 56 refs. NIH Grants No. HE-08184; No. HE-08899; Contract No. Nonr-551.

The rate of pulmonary oxygen toxicity development and its early effects on lung volumes and alveolar-arterial gas exchange were studied experimentally in 11 subjects. Results show that by the 4th hr of oxygen breathing, vital capacity decreased in all but two subjects. This reduction progressed throughout oxygen exposure and the first part of the postexposure period. Recovery of vital capacity occurred within 1-3 days after the exposures. Symptoms began within 3-8 hr of oxygen breathing as a mild tracheal irritation and increased in intensity throughout the exposure. After 8-10 hr of oxygen breathing, symptoms were characterized by uncontrollable coughing, dyspnea at rest, and a constant tracheobronchial burning sensation. Values of average lung volume changes at the end of oxygen breathing and within 1-5 hr after the exposures are presented. It is concluded that the absence of significant changes in the alveolar-arterial oxygen difference measured during oxygen breathing and after oxygen exposures indicates that progressive alveolar atelectasis or severe pulmonary edema is not a prominent feature of early pulmonary oxygen toxicity in man.

O.H.

**A71-29502** **An analysis of peripheral heat transfer in man.** Kenneth H. Keller and Louis Seiler, Jr. (Minnesota University, Minneapolis, Minn.). *Journal of Applied Physiology*, vol. 30, May 1971, p. 779-786. 23 refs. NSF Grant No. GK-1196.

A one-dimensional steady-state continuum model for heat transfer through the tissue of peripheral regions is presented combining the effects of tissue conduction, convection by blood flow, vascular heat exchange, and tissue metabolism. The effective conductivity of the nonisothermal region is determined under various flow conditions. The results are presented graphically and compared with existing data. It is shown that the minimum effective conductivity is the thermal conductivity of the tissue and the maximum is the geometric mean of the conductivity and the capillary perfusion rate. A method for estimating the reduction in effective conductivity due to arterial precooling from anatomical considerations is discussed.

(Author)

**A71-29519 \*** **Teaching serial position sequences to monkeys with a delayed matching-to-sample procedure.** Harry A. Mackay and Stephen M. Brown (Massachusetts General Hospital, Boston, Mass.). *Journal of the Experimental Analysis of Behavior*, vol. 15, May 1971, p. 335-345. 20 refs. NIH Grant No. MH-05408; Grant No. NGR-22-016-003.

Comparison of two methods for training monkeys to 'observe' a two-member serial position sequence by pressing two consecutively lighted keys and then to 'report' the sequence by pressing the same two keys in the same order but without the lights. A fading technique involving gradual elimination of brightness cues from 'reporting' keys was found more effective than a no-fading procedure in which the cues remained bright during training and then were suddenly removed. The results provide evidence that monkeys can learn the complex discrimination involved in matching serial position sequences.

F.R.L.

**A71-29582 \*** **Incorporation of intravenously injected acetate-2-C14 into tissue lipids of hypothermic hamsters.** Cecil Entenman, Paul Ackerman, and X. J. Musacchia (Institute for Lipid Research, Berkeley, Calif.; Missouri, University, Columbia, Mo.). *Society for Experimental Biology and Medicine, Proceedings*, vol. 137, May 1971, p. 47-51. 6 refs. Grants No. NGL-26-004-021; No. NGR-05-005-035.

The body temperatures of the hamsters were reduced to 7°C using the helium-oxygen-cold techniques of Fischer and Musacchia (1968) and Musacchia (1970). Acetate-2-C14 was then injected intravenously and tissues were taken for analysis at intervals ranging between 0.5 to 18 hr thereafter. It is shown that the hypothermic hamster tissues can synthesize lipids even at body temperatures of 7°C, but the amounts synthesized are considerably less than those in normothermic hamsters. The most active tissues at the 7°C temperature are the brain, liver, kidney, and small intestine. G.R.

**A71-29631 \*** **Control of the synthesis of melatonin and other methoxyindoles in the mammalian pineal organ.** Richard J. Wurtman (MIT, Cambridge, Mass.). In: *Neurochemical aspects of hypothalamic function*. Edited by L. Martini and J. Meites. New York, Academic Press, Inc., 1970, p. 135-140. 12 refs. PHS Grant No. AM-11709; Grant No. NGR-22-009-272.

The mammalian pineal is the only locus in the body of an enzyme, hydroxyindole-O-methyl transferase (HIOMT), which catalyzes the biosynthesis of melatonin and other methoxyindoles. Recent studies have shown that the pineal sympathetic nerves control melatonin synthesis by liberating norepinephrine. The normal cycle of environmental lighting to which most animals and humans are exposed generates a parallel rhythm in HIOMT activity and melatonin synthesis. It seems likely that a major function of the pineal organ is to emit a signal (i.e., hormonal melatonin) whose amplitude depends upon time of day and environmental lighting. This signal is then available to all other organs in the body, and could be used to generate or to synchronize daily rhythms in biological functions.

G.R.

**A71-29778 #** **Human factors - A general review of UK and US information.** F. G. Cumming (Royal Aircraft Establishment, Farnborough, Hants., England). In: *Royal Aeronautical Society, International Conference on Atmospheric Turbulence*, London, England, May 18-21, 1971, Proceedings. Conference co-sponsored by the American Institute of Aeronautics and Astronautics and the Canadian Aeronautics and Space Institute. London, Royal Aeronautical Society, 1971. 6 p.

Discussion of problems connected with the degradation of aircrew operator performance caused by vibrations due to atmospheric turbulence. The physiological and psychological effects of mechanical vibration are examined, together with guidelines for vibration levels, and attempts made to alleviate the effects of the frequency ranges occurring in aircraft. It is pointed out that in order to deal with the coupling effects due to turbulence, such as pilot-induced oscillation, it will be necessary to carry out long-term investigations of human sensors in servo analytical terms.

M.M.

**A71-29780 #** **The perception of vertical translational motion by human subjects seated in the upright position.** Richard Malcolm

(Department of National Defence, Institute for Environmental Medicine, Toronto, Canada) and G. Melvill Jones (Defence Research Board, Aviation Medical Research Unit, Montreal, Canada). In: *Royal Aeronautical Society, International Conference on Atmospheric Turbulence*, London, England, May 18-21, 1971, Proceedings. Conference co-sponsored by the American Institute of Aeronautics and Astronautics and the Canadian Aeronautics and Space Institute. London, Royal Aeronautical Society, 1971. 3 p.

A discussion is presented of a series of experiments performed to determine the levels of acceleration in the vertical direction required for correct perception by subjects seated in the upright position, as is the pilot of an aircraft. It is found that functional sensitivity to vertical motion in this position is much less than that which might be inferred from measurements of thresholds to linear accelerations in the other directions and/or orientations.

O.H.

**A71-29781 #** **The simulation of turbulence and its influence on the pilot.** B. N. Tomlinson (Royal Aircraft Establishment, Bedford, England). In: *Royal Aeronautical Society, International Conference on Atmospheric Turbulence*, London, England, May 18-21, 1971, Proceedings. Conference co-sponsored by the American Institute of Aeronautics and Astronautics and the Canadian Aeronautics and Space Institute. London, Royal Aeronautical Society, 1971. 12 p. 10 refs.

The representation and realism of low-altitude turbulence in piloted flight simulators is discussed. In particular, the following four topics are dealt with: how turbulence disturbs an aircraft; how it affects the pilot; why turbulence is simulated; and how it is simulated. The latter topic covers the ability to model mathematically the behavior of an aircraft in turbulence, and the reproduction of representative turbulence itself.

O.H.

**A71-29783 #** **Human performance in the turbulence environment.** G. Bennett (U.S. Department of Trade and Industry, Washington, D.C.). In: *Royal Aeronautical Society, International Conference on Atmospheric Turbulence*, London, England, May 18-21, 1971, Proceedings. Conference co-sponsored by the American Institute of Aeronautics and Astronautics and the Canadian Aeronautics and Space Institute. London, Royal Aeronautical Society, 1971. 8 p. 7 refs.

Physiological and psychological stresses induced during severe in-flight atmospheric disturbances in civil pilots of large subsonic jet aircraft and their effects on the pilots' performance are discussed. In particular, the effects of vibration at critical frequencies on the body, vision, ability to perform manual control tasks, and higher brain functions are considered. Possible solutions to this problem are examined.

O.H.

**A71-29801** **Eye movements and visual perception.** David Noton (Colorado, University, Boulder, Colo.) and Lawrence Stark (California, University, Berkeley, Calif.). *Scientific American*, vol. 224, June 1971, p. 35-43.

As a subject views an object for the first time and becomes familiar with it, he scans it with his eyes and develops a scan path for it. During this time, he lays down the memory traces of the feature ring, which records both sensory activity and the motor activity. When he subsequently encounters the same object again, he recognizes it by matching it with the feature ring, which is its internal representation in his memory. Matching consists in verifying the successive features and carrying out the intervening eye movements, as directed by the feature ring. Experiments are described which support the main features of this hypothesis.

Z.W.

**A71-29821** **The usefulness of the quick-check audiometry for testing the sense of hearing according to fitness regulation No. 28 (Die Verwendbarkeit der Quick-Check-Audiometrie zur Festlegung des Hövermögens nach Ziffer 28 der Tauglichkeitsbestimmungen).** G. Fröhlich. *Wehrmedizinische Monatsschrift*, vol. 15, May 1971, p.

142-147. 6 refs. In German.

Auditory testing methods making use of whispered comments as part of the fitness test have been replaced in the armed forces of the German Federal Republic by the modern screening method of quick-check audiometry. The new methods make use of the audiometer 'Quick-Check,' developed by a firm in Western Germany, which generates sounds at the frequencies of 250, 1000, and 4000 Hz with intensities of 20, 40, and 60 dB. The reliability of the new approach is investigated by comparing the findings with results obtained by the methods of complete tone and speech audiometry.

(G.R.)

**A71-29832 \*** Human attitude control. C. E. Passerello and R. L. Huston (Cincinnati, University, Cincinnati, Ohio). *Journal of Biomechanics*, vol. 4, Mar. 1971, p. 95-102. 7 refs. Grant No. NGL-36-004-014.

Attitude control of the human body in space without the aid of external controlling devices is studied. The human body is modeled by a ten-body system consisting of elliptical cylinders and frustrums of elliptical cones. Equations of motion are derived using the principle of conservation of angular momentum, aided by a systematic organization of the complex geometry. These equations are then numerically integrated for three specific cases providing roll, pitch, and yaw motions of the system. A scheme for extending the human body model to an N-body system is also presented. Finally, the practicality of human attitude control without the aid of controlling devices is discussed and a concept of a training jig for astronauts is presented.

(Author)

**A71-29943 #** Fundamentals of aviation medicine (Osnovy aviatcionnoi meditsiny). A. A. Lavnikov. Moscow, Voenizdat, 1971. 272 p. 65 refs. In Russian.

A brief review of the history and current state of aviation medicine in the Soviet Union. The topics include the physics of the atmosphere, elements of human anatomy and physiology, effects of flight on human organism, medical requirements for aircraft cabins and cockpits, respiratory systems, and aircraft crew diets. The book is addressed to flying personnel, students of aviation schools and institutes, and readers interested in the subject.

V.Z.

**A71-30026 #** Primary mechanism of the action of an electromagnetic field on living organisms (O pervichnom mehanizme deistviya elektromagnitnogo polia na zhivye organizmy). G. Sh. Kevanishvili and T. G. Zhgenti (Tbilisskii Gosudarstvennyi Universitet, Tiflis, Georgian SSR). *Akademii Nauk Gruzinskoi SSR, Soobshcheniya*, vol. 62, Apr. 1971, p. 37-40. 6 refs. In Russian.

A biophysical model simulating the action of an electromagnetic field on a living body is discussed. The model equates a living body to an infinite homogeneous cylinder enclosed in the electromagnetic field of an infinite cylindrical solenoid. The solenoid consists of equidistant circular parallel cophased sinusoidal currents. Expressions are derived to determine the electrodynamic forces induced by the solenoid in the cylinder representing a living body and, consisting of a large number of elementary microbodies.

V.Z.

**A71-30069 \*** Mitotic response to various dietary conditions in the normal and regenerating rat liver. K. S. Talarico, D. D. Feller, and E. D. Neville (NASA, Ames Research Center, Environmental Biology Div., Moffett Field, Calif.). *Society for Experimental Biology and Medicine, Proceedings*, vol. 136, Feb. 1971, p. 381-384. 5 refs.

Rats were subjected to diets high in carbohydrate, protein, or fat for seven days or to a 24-hr fast. Some of these rats were partially hepatectomized and the mitotic activity of the regenerating liver was measured. The level of mitotic activity of the intact liver from the unoperated rats was also determined. The unoperated rats fed the high protein diet showed an increase in the resting mitotic activity, while those fed the high fat diet showed a decrease when these rats

were compared to control rats fed a normal diet. The partially hepatectomized rats fed the high protein and high fat diets or fasted for 24 hr showed a reduced mitotic activity during the periods studied, whereas caloric restriction had no effect. The high carbohydrate diet had no effect on the mitotic activity of either the intact or regenerating liver.

M.M.

**A71-30180 \*** Neuroendocrine transducer cells in mammals. Richard J. Wurtman (MIT, Cambridge, Mass.). In: *The neurosciences: Second study program*. Edited by F. O. Schmitt. New York, Rockefeller University Press, 1970, p. 530-538. 16 refs.

Review of some of the communication properties of the three kinds of mammalian cells specialized to transmit signals from one organ to another, namely, neurons, neuroendocrine transducer cells, and endocrine cells. Two specific examples of transducer cells, pinealocytes and adrenomedullary chromaffin cells, are described.

M.V.E.

**A71-30196** The effectiveness of selected earmuff-type hearing protectors. James M. Flugrath and Basil N. Wolfe, Jr. (Memphis State University, Memphis, Tenn.). *Sound and Vibration*, vol. 5, May 1971, p. 25-27.

Six earmuffs were evaluated for attenuation of narrow band noise on five experienced subjects. The acoustic attenuation was determined with the binaural, free-field, threshold shift technique. Thresholds of detectability using the psychophysical method of adjustment were obtained at standard octave band center frequencies. Earmuff effectiveness was found to be correlated to weight and volume of the muff and pressure of the headband. There was a range of 5 to 10 dB difference between the least effective and most effective earmuff. All of the earmuffs attenuated at least 24 dB in the higher frequencies.

(Author)

**A71-30250** A quantitative study of vestibular adaptation in humans. R. Malcolm and G. Melville Jones (Defence Research Board, Aviation Medical Research Unit, Montreal, Canada). *Acta Oto-Laryngologica*, vol. 70, 1970, p. 126-135. 18 refs.

A mathematical model for short-term adaptation to vestibular stimuli is presented. A transfer function is derived relating slow phase angular velocity of resulting nystagmus to the angular velocity of head rotation. The resulting model has been tested by comparing its responses to controlled step and ramp angular velocity stimuli with those of 8 human subjects, and in all cases a close match was obtained. The mean time constant of the adaptive term was 82 sec and the mean cupular restoration time constant (Tc) was 21 sec. It is suggested that previous values quoted for Tc represent underestimates of the true value owing to superposition of the adaptive term here described. The adaptive term accounts well for the phenomenon of secondary nystagmus, especially during either strong stimuli or prolonged rotations. Some implications of the findings in relation to clinical and aviation medicine are discussed.

(Author)

**A71-30251** Contributions to sensory physiology. Volume 4. Edited by W. D. Neff (Indiana University, Bloomington, Ind.). New York, Academic Press, Inc., 1970. 227 p. \$11.50.

Experimental studies of the anatomy and mechanisms of the mammalian sensory systems, including vision, audition, and touch. Analyses are presented of the spatial and temporal discrimination functions of these systems in man. Features of the endolymphatic sac, cochlear aqueduct, and superior olive S-segment in man and cat are discussed. Anatomical aspects of the cochlear nucleus and superior olfactory complex, and psychophysical studies of human temperature sensibility are reviewed. The results obtained contribute to the theory for the physiological basis of sensation.

Individual items are abstracted in this issue.

Z.W.

**A71-30252** Vision, audition, and beyond. Frank A. Geldard (Princeton University, Princeton, N.J.). In: *Contributions to sensory physiology*. Volume 4. Edited by W. D.

Neff. New York, Academic Press, Inc., 1970, p. 1-17. 24 refs.  
NIH-supported research.

Discussion of the spatial and temporal discrimination functions in vision, audition, and touch. The use of vibrators for establishing and controlling stimuli in multiple arrays on the body is described. The works of Gilson (1968) concerning the cutaneous communication system are discussed. The works concerning the time-discriminating ability of different senses are reviewed, including perception of duration, successiveness, gap detection, lateralization, and flicker-flutter fusion. Z.W.

**A71-30253** **Psychophysical studies of temperature sensitivity.** Dan R. Kenshalo (Florida State University, Tallahassee, Fla.). In: Contributions to sensory physiology. Volume 4. Edited by W. D. Neff. New York, Academic Press, Inc., 1970, p. 19-74. 101 refs. PHS Grant No. NB-02992; NSF Grant No. GB-2473.

Study of the parameters that affect the temperature sensitivity of the skin, description of the neural correlates of thermal sensation, and identification of the receptors of the skin that are responsible for an organism's sensitivity to thermal stimulation. It was found that there are three primary variables of temperature stimulation: (1) temperature of the skin, (2) the area of skin over which the temperature is applied, and (3) a time factor which is best characterized by the rate at which thermal receptors adapt. The receptive processes adapt, and within a restricted range of temperatures they adapt completely. The temperature to which the skin was adapted affects the temperatures of warm or cool thresholds. The changes in cool sensitivity, measured after the skin was adapted to high temperatures, are correlated with changes in cutaneous vaso-motor activity attendant with the subject's condition. Z.W.

**A71-30254** **Pathophysiology of the fluid systems of the inner ear.** Harold F. Schuknecht (Harvard University; Massachusetts Eye and Ear Infirmary, Boston, Mass.). In: Contributions to sensory physiology. Volume 4. Edited by W. D. Neff. New York, Academic Press, Inc., 1970, p. 75-93. 38 refs.

Study of the significance of endolymph and perilymph fluids by observing the changes occurring in induced and spontaneous inner ear disorders. Alterations in staining and increase in the volume of endolymph are discussed. The possible functions of the endolympatic sac and cochlear aqueduct are examined. The significance of the endolymph-perilymph fistulae is examined, and it is concluded that the biochemical and bioelectric properties of the cochlear duct can be maintained within a few millimeters of a fistula. The relationship between the labyrinthine fluid biochemistry and certain types of sensorineural deafness is investigated. Z.W.

**A71-30255** **Anatomical aspects of the cochlear nucleus and superior olivary complex.** J. M. Harrison and M. L. Feldman (Boston University, Boston; Massachusetts and New England Regional Primate Research Center; Harvard University, Southborough, Mass.). In: Contributions to sensory physiology. Volume 4. Edited by W. D. Neff. New York, Academic Press, Inc., 1970, p. 95-142. 68 refs. NSF Grant No. GB-7617.

Study of the central projection of the acoustic nerve, the cochlear nucleus, and the superior olivary complex in order to investigate the organization of the ascending auditory system. The problem is approached in two ways: (1) by a study of the organization of the system in one species (the rat), and (2) by a study of the size variation of the nuclei and tracts of the system in different species of mammals, particularly those in which something is known about the auditory behavior. An attempt was made to measure the ability of animals to localize sound in space under relatively natural conditions and to determine the dimensions along which localization varies in different mammalian species. Z.W.

**A71-30275** **Hypoxia, high altitude and the heart; Proceedings of the First Conference on Cardiovascular Disease, Aspen, Colo., January 11-13, 1970.** Conference sponsored by the American College of Cardiology and the University of Colorado. Edited by J. H. K. Vogel. Basel, S. Karger AG (Advances in Cardiology. Volume 5), 1970. 205 p. \$14.15.

The purpose of this conference is to provide information from high altitude studies in order to enhance the understanding of the effects of hypoxia on cardiovascular performance. By integrating these observations with those obtained in patients with various diseased states, it might be possible to develop a more sophisticated appreciation of the effects of hypoxia. Topics deal with physiologic changes at altitude, the coronary circulation, respiratory control, and the pulmonary circulation.

M.M.

**A71-30276** **Limitation of aerobic working capacity at high altitude.** R. F. Grover (Colorado, University, Denver, Colo.). In: Hypoxia, high altitude and the heart; Proceedings of the First Conference on Cardiovascular Disease, Aspen, Colo., January 11-13, 1970.

Conference sponsored by the American College of Cardiology and the University of Colorado. Edited by J. H. K. Vogel. Basel, S. Karger AG (Advances in Cardiology. Volume 5), 1970, p. 11-16. 13 refs.

An examination of the various steps in the oxygen transport system, and of their modifications at altitude, reveals that aerobic working capacity is limited primarily by circulatory factors. The capacity of the lung for ventilation and diffusion is not taxed to the limit. Blood oxygenation, particularly oxygen content, is well maintained at moderate altitudes. It is the heart which pumps less adequately, delivering less blood per beat, and for reasons as yet unexplained. During exercise, blood flow to working muscle is increased both by increasing total systemic blood flow and by altering the distribution of systemic blood flow with diversion away from nonexercising organs. How this redistribution of blood flow may be modified at altitude is not known.

M.M.

**A71-30277** **High altitude pulmonary edema.** H. N. Hultgren (Stanford University, Palo Alto, Calif.). In: Hypoxia, high altitude and the heart; Proceedings of the First Conference on Cardiovascular Disease, Aspen, Colo., January 11-13, 1970.

Conference sponsored by the American College of Cardiology and the University of Colorado. Edited by J. H. K. Vogel. Basel, S. Karger AG (Advances in Cardiology. Volume 5), 1970, p. 24-31. 6 refs.

Discussion of the symptoms, incidence, etiology, and prevention of high altitude pulmonary edema (HAPE), a potentially fatal form of noncardiac pulmonary edema which occurs in unacclimatized man who ascends rapidly to an altitude in excess of 9000 ft. HAPE more commonly involves children from 5-18 years than adults. Males are afflicted more commonly than females. It is pointed out that the etiology of HAPE is not known. However, there is an acute disturbance of the hemodynamics of the pulmonary circulation, characterized by pulmonary arterial hypertension and a widened A-a (alveolar-arterial) oxygen gradient. Thus HAPE represents another cause of pulmonary edema without left ventricular failure or elevated left atrial pressure.

M.M.

**A71-30278** **Alterations in blood coagulation at high altitude.** E. Genton, A. M. Ross, Y. A. Takeda, and J. H. K. Vogel (Colorado, University, Denver, Colo.). In: Hypoxia, high altitude and the heart; Proceedings of the First Conference on Cardiovascular Disease, Aspen, Colo., January 11-13, 1970.

Conference sponsored by the American College of Cardiology and the University of Colorado. Edited by J. H. K. Vogel. Basel, S. Karger AG (Advances in Cardiology. Volume 5), 1970, p. 32-40. 19 refs. PHS Grants No. HE-11686; No. HE-10200.

Data exist which seem to support the thesis that altitude exposure may alter blood coagulation. A study was made on animals

**A71-30279**

exposed to altitude to determine the effects on the survival time of platelets labeled with chromium and I(125)-labeled fibrinogen and on coagulation tests that reflected the various stages of clotting and fibrinolysis. The study demonstrated that, in calves at altitude, a marked alteration in coagulation assays rapidly occurred which suggested the development of a hypercoagulable state. This is confirmed by turnover studies of platelets and fibrinogen, both being significantly shortened.

M.M.

**A71-30279      Increased alveolar-arterial oxygen gradients during treadmill walking at simulated high altitude.** J. T. Reeves and F. Daoud (Kentucky, University, Lexington, Ky.). In: Hypoxia, high altitude and the heart; Proceedings of the First Conference on Cardiovascular Disease, Aspen, Colo., January 11-13, 1970.

Conference sponsored by the American College of Cardiology and the University of Colorado. Edited by J. H. K. Vogel. Basel, S. Karger AG (Advances in Cardiology. Volume 5), 1970, p. 41-48. 9 refs. NIH Grants No. HE-06780; No. HE-08932; No. HE-05598.

Investigation of the effect of a 2-hr constant treadmill exercise at the altitude of 15,000 ft on the alveolar-arterial (A-a) gradient of eight healthy volunteers. The study showed a marked increase in the A-a oxygen gradient during exercise at high altitude, which did not return to control values after exercise. It is suggested that this may represent fluid accumulation within the lung. It is pointed out that further work is needed to determine whether these findings relate to the syndrome of high altitude pulmonary edema.

M.M.

**A71-30280      Reduction of systemic arterial blood pressure at high altitude.** H. N. Hultgren (Stanford University, Palo Alto, Calif.). In: Hypoxia, high altitude and the heart; Proceedings of the First Conference on Cardiovascular Disease, Aspen, Colo., January 11-13, 1970.

Conference sponsored by the American College of Cardiology and the University of Colorado. Edited by J. H. K. Vogel. Basel, S. Karger AG (Advances in Cardiology. Volume 5), 1970, p. 49-55. 15 refs.

Brief review of investigations of the effect of chronic exposure to high altitude upon systemic blood pressure. Studies made on men and animals show that systemic blood pressure is affected significantly by chronic hypoxia. The mechanism by which chronic hypoxia affects systemic blood pressure is unknown. High altitude natives exhibit a different systemic blood pressure response to acute hypoxia than sea level dwellers. There is no increase in cardiac output, a fall in systemic blood pressure and postural hypotension during acute hypoxia. Sea level residents subjected to acute hypoxia respond by an increase in cardiac output and no change in systemic blood pressure.

M.M.

**A71-30281      Effects of acute and chronic hypoxia on coronary blood flow.** R. M. Berne, R. Rubio, B. R. Duling, and V. T. Wiedmeier (Virginia, University, Charlottesville, Va.). In: Hypoxia, high altitude and the heart; Proceedings of the First Conference on Cardiovascular Disease, Aspen, Colo., January 11-13, 1970.

Conference sponsored by the American College of Cardiology and the University of Colorado. Edited by J. H. K. Vogel. Basel, S. Karger AG (Advances in Cardiology. Volume 5), 1970, p. 56-66. 15 refs. PHS Grant No. HE-10384.

Brief review of investigations of the relationship between hypoxia and coronary blood flow. It is pointed out that for many years it has been generally accepted that hypoxia is the most potent means of eliciting coronary dilation, and more recently it has been demonstrated that hyperoxia elicits coronary vasoconstriction (Daniell and Bagwell, 1968; Lammerant et al., 1968; and Sobol et al., 1962). Although reduced oxygen tension can produce vascular smooth muscle relaxation in isolated vessels and in the intact circulation of the hamster cheek pouch, the close parallelism between the magnitude of coronary flow and the quantity of adenosine released by the heart in hypoxia suggests that adenosine is the mediator of coronary dilation.

M.M.

**A71-30282      Effects of pulmonary hypertension and hypoxia on coronary vascular development.** H. R. Overy (Colorado, University, Denver, Colo.). In: Hypoxia, high altitude and the heart; Proceedings of the First Conference on Cardiovascular Disease, Aspen, Colo., January 11-13, 1970.

Conference sponsored by the American College of Cardiology and the University of Colorado. Edited by J. H. K. Vogel. Basel, S. Karger AG (Advances in Cardiology. Volume 5), 1970, p. 67-71.

Experimental animal investigation of the independent effects of pulmonary hypertension and hypoxemia on coronary circulation. A marked change in coronary vasculature has been demonstrated in response to one of the principal effects of hypoxia, namely, pulmonary hypertension. It is suggested that this development results not only from the increased mass of the right ventricle, but from the change in the phasic contour of the flow in the main vessels supplying the hypertensive right ventricle. This experiment has not shown any change in the larger vessels supplying the myocardium in response to a hypoxic stimulus, but the evidence of other workers, and experiments with Dinitrophenol, indicate that an increase in the diameter and/or number of vessels at the arteriolar or capillary level occurs in response to systemic hypoxemia.

M.M.

**A71-30283      Decreased coronary blood flow in man following ascent to high altitude.** R. F. Grover (Colorado, University, Denver, Colo.), R. Lufschanski, and J. K. Alexander (Baylor University, Houston, Tex.). In: Hypoxia, high altitude and the heart; Proceedings of the First Conference on Cardiovascular Disease, Aspen, Colo., January 11-13, 1970.

Conference sponsored by the American College of Cardiology and the University of Colorado. Edited by J. H. K. Vogel. Basel, S. Karger AG (Advances in Cardiology. Volume 5), 1970, p. 72-79. 15 refs. NIH Grants No. HE-5435; No. HE-08728.

Investigation of the effects of altitude on the coronary and systemic hemodynamics of three normal young men native to low altitude who traveled to an altitude of 3100 m. It appears from the experimental data that when man adapts to chronic hypoxia at altitude, blood flow decreases and oxygen extraction increases in the coronary circulation as in the body as a whole. The site of adaptation appears to be in the peripheral circulation. While a decrease in coronary blood flow (CBF) appears to be a paradoxical response to the atmospheric hypoxia of high altitude, such a decrease may in fact be compatible with the concept that CBF is autoregulated to maintain a constant myocardial oxygen tension.

M.M.

**A71-30284      Coronary blood flow during short term exposure to high altitude.** J. H. K. Vogel, Gail Jamieson, Maria Delivoria-Papadopoulos, R. D. Lueker, H. L. Brammell, and D. Brake (Colorado, University, Denver, Colo.). In: Hypoxia, high altitude and the heart; Proceedings of the First Conference on Cardiovascular Disease, Aspen, Colo., January 11-13, 1970.

Conference sponsored by the American College of Cardiology and the University of Colorado. Edited by J. H. K. Vogel. Basel, S. Karger AG (Advances in Cardiology. Volume 5), 1970, p. 80-85. Research supported by the American Heart Association.

Determination of the relationship of the reduction in cardiac output to coronary blood flow (CBF) by observing the changes in CBF during exposure to high altitude in young calves. It was found that, with 20-day exposure to the altitude of 14,160 ft, a significant reduction in CBF occurs. In general, the alterations in CBF paralleled the changes in ventricular work, irrespective of the altitude. This suggests that CBF changes in a manner appropriate to ventricular work, and that the reduction in CBF at high altitude is not responsible for the reduction in cardiac output and stroke volume that has been noted in man during prolonged exposure at high altitude.

M.M.

**A71-30285      Electrocardiographic observations on high altitude residents.** R. Pryor (Colorado, University, Denver, Colo.). In: Hypoxia, high altitude and the heart; Proceedings of the First

Conference on Cardiovascular Disease, Aspen, Colo., January 11-13, 1970. Conference sponsored by the American College of Cardiology and the University of Colorado. Edited by J. H. K. Vogel. Basel, S. Karger AG (Advances in Cardiology. Volume 5), 1970, p. 86-91. 13 refs. PHS Grant No. 5 TO1 HE-05134; NIH Grant No. 5 ROI HE-01208.

Clinical cardiovascular evaluations were performed on 508 school children living at 10,150 ft in Leadville, Colo. Thirty per cent of the subjects had electrocardiographic findings suggestive of right ventricular enlargement. The study suggests that right ventricular preponderance is a relatively common electrocardiographic observation in teenage children living above 10,000 ft which is thought to be a critical altitude relative to pulmonary circulation. These electrocardiographic observations correlate with the clinical and laboratory findings suggestive of reactive pulmonary hypertension which is believed to be related to anatomic and functional changes in the pulmonary vascular bed as a consequence of acclimatization to life at high altitude. M.M.

**A71-30286** Angina and infarction occurring with patent coronary arteries and decreased rate of oxygen release. R. S. Eliot, J. M. Salhany, and H. Mizukami (U.S. Veterans Administration Hospital; Florida, University, Gainesville, Fla.). In: Hypoxia, high altitude and the heart; Proceedings of the First Conference on Cardiovascular Disease, Aspen, Colo., January 11-13, 1970.

Conference sponsored by the American College of Cardiology and the University of Colorado. Edited by J. H. K. Vogel. Basel, S. Karger AG (Advances in Cardiology. Volume 5), 1970, p. 106-112. 21 refs. Research supported by the Michigan Heart Association and Florida Heart Association; NIH Grants No. HE-11910; No. AM-10838.

Investigation of the possible existence of deranged hemoglobin-oxygen transport, superimposed upon varying degrees of coronary atherosclerosis, such as might influence the potential for oxygen release, in four patients with normal coronary arteriograms having myocardial ischemia, necrosis, or both. In each patient, a decreased rate of oxygen release by hemoglobin was demonstrated by direct kinetic measurement. In those studied there was a decreased responsiveness to 2,3-diphosphoglycerate and pH change. When this hemoglobin-oxygen derangement exists alone or superimposed upon other predisposing factors, it may contribute to myocardial ischemia and even necrosis. M.M.

**A71-30287** Pathophysiological correlations in coronary artery disease. G. G. Gensini (St. Joseph's Hospital, Syracuse, N.Y.). In: Hypoxia, high altitude and the heart; Proceedings of the First Conference on Cardiovascular Disease, Aspen, Colo., January 11-13, 1970. Conference sponsored by the American College of Cardiology and the University of Colorado. Edited by J. H. K. Vogel. Basel, S. Karger AG (Advances in Cardiology. Volume 5), 1970, p. 113-125. 13 refs. Research supported by the Atlas Chemical Industries.

Discussion of the characteristics of myocardial ischemia or the impaired availability of oxygen to the myocardium usually resulting from obstructive coronary artery disease. Myocardial ischemia arises whenever an imbalance is reached at the level of the myocardium between supply, utilization, and demand of oxygen. The irreversible injury (myocardial infarction) usually is caused by a sudden and complete obliteration of the blood supply to a segment of the myocardium and only rarely occurs in cases of impaired utilization or excessive demand. It is pointed out that accurate morphologic and pathophysiologic correlations, otherwise unavailable, can be obtained by the complete utilization of the conventional techniques of cinecoronary arteriography, left ventriculography, and hemodynamic studies performed before and after stress and vasodilators. M.M.

**A71-30288** Evaluation of hypoxic ventilatory drive findings at high altitude. J. V. Weil, E. Byrne-Quinn, I. E. Sodal, G. F. Filley, and R. F. Grover (Colorado, University, Denver, Colo.). In: Hypoxia, high altitude and the heart; Proceedings of the First

Conference on Cardiovascular Disease, Aspen, Colo., January 11-13, 1970. Conference sponsored by the American College of Cardiology and the University of Colorado. Edited by J. H. K. Vogel. Basel, S. Karger AG (Advances in Cardiology. Volume 5), 1970, p. 132-138. 14 refs.

Studies indicate that, in persons native to high altitude, hypoxic ventilatory drive is reduced to about one-tenth the value observed in low altitude subjects and, in long term nonnative residents of high altitude, hypoxic ventilatory drive is reduced to about one-third of that in low-altitude subjects. Hypoxic ventilatory drive was inversely related to time spent at high altitude. The ventilatory response to hypercapnia was also attenuated in the high altitude subjects. The findings suggest that progressive loss of chemoreceptor function occurs in man as a consequence of prolonged exposure to high altitude, even when this exposure begins in adulthood. M.M.

**A71-30289** The effect of polycythemia on respiratory sensitivity. G. E. Bisgard (Wisconsin, University, Madison, Wis.) and R. F. Grover (Colorado, University, Denver, Colo.). In: Hypoxia, high altitude and the heart; Proceedings of the First Conference on Cardiovascular Disease, Aspen, Colo., January 11-13, 1970.

Conference sponsored by the American College of Cardiology and the University of Colorado. Edited by J. H. K. Vogel. Basel, S. Karger AG (Advances in Cardiology. Volume 5), 1970, p. 139-143. 12 refs. PHS Grant No. HE-06895.

Investigation of the influence of increasing blood oxygen carrying capacity on ventilatory control in acute hypoxia in calves. On the basis of the results obtained, it is postulated that polycythemia augments oxygen transport in the presence of a given degree of hypoxia resulting in less chemoreceptor tissue hypoxia and therefore less stimulation of respiration. It is suggested that a degree of polycythemia is of value in respiratory adaptation to chronic hypoxia. M.M.

**A71-30312** Instrumentation for man and equipment in simulated space environment. Carlo J. Montera (Brown and Root-Northrop Corp., Houston, Tex.). In: Instrument Society of America, International Aerospace Instrumentation Symposium, 17th, Las Vegas, Nev., May 10-12, 1971, Proceedings.

Edited by B. Washburn. Pittsburgh, Instrument Society of America (Instrumentation in the Aerospace Industry. Volume 17), 1971, p. 22-24.

Brown and Root-Northrop's role at the Manned Spacecraft Center is that of providing technical operation of NASA laboratories. The Crew Systems Laboratory is involved with the testing of astronauts and spacecraft life support systems. The complete testing team made up of NASA Engineers and Medical Personnel supported by BRN and other contractors utilizes the readout information from instrumentation to determine engineering and medical Go, No-Go situations during manned and unmanned testing. Testing provides training and interface of the man and his life support systems and provides confidence to assure successful completion of all mission phases. The manned environmental testing is accomplished in man-rated vacuum chambers and the centrifuge facility. The basic instrumentation utilized for obtaining information for recording and displaying purposes is made up of pressure and vacuum transducers. Temperature sensing devices, sensors for determining oxygen, nitrogen and carbon dioxide gases present in the Life Support System Loop, dew point sensors and sensors for determining the physiological condition of the test subject. Closed circuit television provides continual monitoring during testing. (Author)

**A71-30313 \*** A carbon dioxide concentrator for space cabin environments. F. Roehlich, F. Tepper, D. A. Green, and J. W. Mausteller (MSA Research Corp., Evans City, Pa.). In: Instrument Society of America, International Aerospace Instrumentation Symposium, 17th, Las Vegas, Nev., May 10-12, 1971, Proceedings.

Edited by B. Washburn. Pittsburgh, Instrument Society of America (Instrumentation in the Aerospace Industry. Volume 17), 1971, p. 25-29. 5 refs. Contract No. NAS 2-4639.

## A71-30344

A novel regenerative system for the removal and concentration of CO<sub>2</sub>, constructed for use in a NASA space-simulator cabin, is described. Components discussed include flowmeter, pressure transducers, thermistor circuits, timing devices, and moisture monitor. Special problems associated with operation of the system in an oxygen-enriched cabin environment are examined in terms of intrinsically safe circuitry and the design of a purged equipment cabinet. M.V.E.

**A71-30344 \*** Design and development of a microbiological respirometer with space flight applications. Peter C. Taudvin, Bruce W. Pince (Space/Defense Corp., Birmingham, Mich.), and Jerome M. Paros (Kistler Instrument Co., Redmond, Wash.). In: Instrument Society of America, International Aerospace Instrumentation Symposium, 17th, Las Vegas, Nev., May 10-12, 1971, Proceedings.

Edited by B. Washburn. Pittsburgh, Instrument Society of America (Instrumentation in the Aerospace Industry. Volume 17), 1971, p. 368-378. 27 refs. Contracts No. NASW-870; No. NAS 9-9302.

A new microrespirometer designed for oxidative metabolism studies of a wide variety of plants and/or small animals, which also meets specifications for Manned Space Flight, is described. The 5100 gram respirometer is unique in its mechanical strength, small size, reliability, and simplicity, and in that it performs with resolutions, reproducibility, and accuracy only found in large complex laboratory devices. It consists of a life support system for the specimen and a data acquisition and storage system. Oxygen consumption rates of less than ten microliters per hour can be resolved. Precise pressure, light, temperature, relative humidity, and gaseous partial pressure control is provided. O.H.

**A71-30406 #** Experimental refutation of some hypotheses on 'sensation time' (Experimentelle Widerlegung einiger Hypothesen zur 'Empfindungszeit'). Gero Freiknecht and Peter Scheffler. *Zeitschrift für experimentelle und angewandte Psychologie*, vol. 18, 1st Quarter, 1971, p. 90-100. In German.

Experimental investigations were carried out to examine the validity of the 'sensation time' theory proposed by Hazelhoff and Fröhlich which suggests that a certain time, called 'sensation time,' elapses between the stimulation of a receptor and the experiencing of the sensation. Results obtained reveal no sensation time and, therefore, do not confirm the theory. O.H.

**A71-30411** On the origin of respiratory waves in circulation. I. M. Manoach, S. Gitter (Tel Aviv, University, Tel Aviv, Israel), I. M. Levinger (Bar-Ilan University, Ramat Gan, Israel), and S. Stricker (Technion - Israel Institute of Technology, Haifa, Israel). *Pflügers Archiv*, vol. 325, no. 1, 1971, p. 40-49. 15 refs.

A study was performed of the factors known to influence the formation of respiratory waves which modulate arterial blood pressure recordings and photoplethysmograms - i.e., the central and peripheral generators. While testing the separate activities of the generators, it was found that input signals could be obtained exclusively from the peripheral generator under natural as well as artificial functioning. Input signals from the central generator, however, were obtained only at an increased level of functioning. The activities of the two generators were tested separately and simultaneously, at a uniform and variable pace, and the conditions indicated prevailed also during their joint activity. It is therefore deduced that the respiratory waves originate primarily from the peripheral generator in the course of natural respiration. O.H.

**A71-30412** On the origin of respiratory waves in circulation. II. M. Manoach, S. Gitter (Tel Aviv, University, Tel Aviv, Israel), I. M. Levinger (Bar-Ilan University, Ramat Gan, Israel), and S. Stricker (Technion - Israel Institute of Technology, Haifa, Israel). *Pflügers Archiv*, vol. 325, no. 1, 1971, p. 50-60. 16 refs.

The basic pattern of the respiratory wave which is obtained during artificial activation of the diaphragm of a cat by a rectangular

stimulus to the phrenic nerves is studied. The objective was to determine whether the inspiration exerts an influence on the blood pressure and state of blood vessels different from that of expiration. The findings indicate that the respiratory wave comprises a superposition of two identical but inverse components, the one constituting a response to inspiration and the other to expiration. O.H.

**A71-30416 #** Possibilities of limiting the accommodation range of the eye, with particular reference to the increase of the adjustment accuracy of optico-mechanical instruments (Možnosti omezení akomodačního rozsahu oka se zaměřením na zvýšení přesnosti justáže opticko-mechanických přístrojů). Engelbert Keprt (Palackého Univerzita, Olomouc, Czechoslovakia). *Jemná Mechanika a Optika*, vol. 16, May 1971, p. 119-123. In Czech.

The influence of the spectacle lens, telescope, magnifying glass, and microscope on the accommodation range of the observer's eye is examined. It is found that the accommodation range in all these cases is considerably reduced, which can be utilized to increase the adjustment accuracy. O.H.

**A71-30461** Computer simulation models of human behavior - A history of an intellectual technology. John M. Dutton (Southern Methodist University, Dallas, Tex.) and William H. Starbuck. *IEEE Transactions on Systems, Man, and Cybernetics*, vol. SMC-1, Apr. 1971, p. 128-171. 2032 refs.

The history of the growth and development of the technology of computer simulation is reflected in an analysis of 2034 sight-read and classified simulation studies of human behavior published before 1971. The limiting goal of the work was an exhaustive bibliography of these simulation studies. The empirical studies referenced are classified into four major model categories for analysis: (1) individuals, (2) individual's who interact, (3) individuals who aggregate, and (4) individuals who aggregate and interact. Each of these studies is also classified into one of eight types, according to the empirical relationship between the model and reality. Additional classifications are employed to described methodological studies. The analysis includes estimates of the completeness of the bibliography and of the reliability of the classification scheme, as well as the distributions of studies by category and type. (Author)

**A71-30467** Physical properties of fluids and structures of vestibular apparatus of the pigeon. K. E. Money, L. Bonen, J. D. Beatty, L. A. Kuehn, M. Sokoloff, and R. S. Weaver (Centre de Recherches pour la Défense, Toronto, Canada). *American Journal of Physiology*, vol. 220, Jan. 1971, p. 140-147. 26 refs.

It was found that the specific gravity and viscosity of pigeon endolymph were 1.0017 and 1.19 cp and those of perilymph were 1.0006 and 0.76 cp, respectively, when the pigeon body temperature was 44 deg C. There was no measurable difference between the specific gravity of the cupula and endolymph, and the specific gravity of cut lengths of the membranous semicircular ducts with enclosed endolymph was 1.03. These data are believed to indicate that gravity and linear acceleration cannot act directly on the cupula but can cause movement or distortion of the membranous labyrinth with resulting endolymph movement and cupular deflection. It is suggested that the responses of the semicircular duct to small and large angular accelerations may be very different. V.Z.

**A71-30503** Electroretinographic study of the rod-cone break in the dark adaptation curve in man. Jean-Real Brunette (Hôpital Maisonneuve, Montreal, Canada). *American Journal of Ophthalmology*, vol. 71, May 1971, p. 1104-1112. 20 refs. Medical Research Council of Canada Grant No. MA-2593.

The results of this study show that prior bleaching determines the appearance of a break in the electroretinographic (ERG) dark-adaptation recovery curves. This break is present simultaneously in the curves of the four major components, A-1, A-2, B-1, and B-2. Its time of appearance, depending on the intensity of the bleach, is

similar to that of the alpha point in psychophysical curves. The global ERG, as recorded under casual clinical conditions by the use of xenon flash tubes, actually represents the summation of the response from the cones and rods. Although rod and cone activities are recorded, their potentials are summated and cannot be differentiated one from another. Under such clinical recording conditions, the value of cone and rod activity evaluation through the simple amplitude measurements of the so-called photopic components, A-1 and B-1, and scotopic components, A-2 and B-2, are questioned.

T.M.

**A71-30551 # Features of the alpha rhythm in different cortex regions of a healthy human on the basis of frequency and correlation analyses data** (Osobennosti alpha-ritma v raznykh oblastiakh kory zdorovogo cheloveka po dannym chastotnogo i korreliatsionnogo analizov). N. S. Galkina (Akademija Meditsinskikh Nauk SSSR, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Apr. 1971, p. 481-489. 26 refs. In Russian.

Correlation and frequency analyses of EEG data for 50 healthy human subjects show that the anterior and posterior regions differ in total activity, periodicity, and mean frequency of the alpha rhythm. High symmetry of alpha activity in homologous points of the hemispheres was indicated by total energy, mean frequency, and periodicity measures. Both uniform and nonuniform spatial distributions of the alpha rhythm were observed; the nonuniform distributions were characterized by alpha activity in occipital regions twice as high as that in frontal regions. Stimulation by light caused a statistically significant drop in total alpha activity within all regions except the temporal areas. The degree of suppression and changes in the correlation of alpha rhythms in symmetrical points depended on the background EEG.

T.M.

**A71-30552 # Restitution processes after muscular activity in different temperature conditions** (Protsessy restitutii posle myshchnoi deiatel'nosti v razlichnykh temperaturnykh usloviiakh). N. N. Iakovlev, A. F. Krasnova, R. I. Lenkova, G. I. Samodanova, and N. R. Chagovets (Leningradskii Nauchno-Issledovatel'skii Institut Fizicheskoi Kultury, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Apr. 1971, p. 556-561. 16 refs. In Russian.

Increased adaptation to intense muscular work in adult albino rats reduced all biochemical changes arising in muscles as a result of muscular activity. As a consequence, the further development of adaptive changes in the muscular system was substantially slowed down. Combination of muscular activity with a drop in temperature caused sharp changes in the blood and muscle chemistry of trained rats and substantially enhanced anabolic processes in the period of recovery after work.

T.M.

**A71-30553 # Changes in the physiological properties of muscles as a result of maximum motor loads** (Izmenenie fiziologicheskikh svoistv mysht v rezul'tate predel'nykh dvigatelelynykh nagruzok). I. N. Ushkova (Leningradskii Nauchno-Issledovatel'skii Institut Gigienny Truda i Profzabolenvani, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Apr. 1971, p. 562-565. In Russian.

Tests conducted with 124 albino rats showed that high motor stresses increased the acetylcholine content in the muscles, enhanced the cholinesterase activity, and changed the localization of the latter. Additional changes included increased muscular rheobase and chronaxy, tendency toward fusion of solitary contractions, and hampered pessimal weakening.

T.M.

**A71-30565 \*** **Influence of chronic hypoxia on blood gas tensions and pH in domestic fowl.** E. L. Besch, R. R. Burton, and A. H. Smith (Kansas State University of Agriculture and Applied Science, Manhattan, Kan.; California, University, Davis, Calif.). *American Journal of Physiology*, vol. 220, May 1971, p. 1379-1382. 19 refs. PHS Grant No. HE-01920; Grant No. NGR-05-004-008.

Blood gas tensions and pH changes resulting from chronic hypoxia were evident in both venous and arterial blood of unanesthetized, adult, male single-comb white leghorn chickens kept at 12,500 ft above sea level. Compared with sea-level control chickens, the changes - involving (1) a reduction in oxygen and carbon dioxide tensions and (2) a slight, but significant, increase in blood pH - were found to be significant. The percentage changes (from sea-level values) attributed to chronic hypoxia in anesthetized chickens approximated, qualitatively, those found in unanesthetized birds. General anesthesia apparently reduced  $P_{\text{sub}} \text{O}_2$  and pH and increased  $P_{\text{sub}} \text{CO}_2$  both at sea level and at 12,500 ft. The increased acute hypoxia tolerance in 'native' birds at high altitude may be a manifestation of the reduced buffering capacity of the plasma of those animals. Moreover, the source of blood for gas analysis appeared to be important, for, at sea level, there was a significant decrease in the  $P_{\text{sub}} \text{VO}_2$  in jugular, compared with brachial, vein blood.

(Author)

**A71-30566 Mechanical properties of urinary bladder.** Robert S. Alexander (Union University, Albany, N.Y.). *American Journal of Physiology*, vol. 220, May 1971, p. 1413-1421. 21 refs. NSF-supported research.

Bladders of rats, rabbits, and cats were subjected to controlled stretches to determine the nature of the mechanical components of the tissue. Three basic mechanical components were identified: a rapid viscoelastic element, a slow plastoelastic element, and a very slow creep. The rapid viscoelasticity appeared to be in series with the contractile elements. The plastoelasticity appeared to be resident within the contractile system itself, as evidenced by the effects of muscle contraction and Ca ion on its properties; it was identified as plastoelastic because it exhibited yielding primarily as a function of wall tension, rather than as a viscous time-dependent process. The slow creep became manifest only at large bladder volumes and had the unique attribute of being irreversible over periods in excess of 12 hr. This creep appeared to reside in an element that was in parallel with the contractile component and included a slack element to eliminate its participation over the normal range of distension. In the lightly anesthetized cat, rhythmic activity of the bladder smooth muscle as well as the micturition reflex conserve bladder volume well in advance of bladder distensions to the range where this creep might become manifest.

(Author)

**A71-30567 Carbon dioxide elimination across human skin.** Israel Alkalay, Susumu Suetsugu, Herbert Constantine, and Myron Stein (Brown University; Rhode Island Hospital, Providence, R.I.). *American Journal of Physiology*, vol. 220, May 1971, p. 1434-1436. 7 refs. NIH Grant No. HE-10017.

Carbon dioxide elimination across the skin was studied in 10 male and five female healthy subjects, sitting in a sealed-body plethysmograph. The following mean values and standard deviations were obtained: male subjects, 0.99 plus or minus 0.44, female subjects, 0.39 plus or minus 0.26 (ml/min per sq m of BSA STPD). This sex difference of carbon dioxide elimination is statistically significant. After intramuscular injection of atropine sulphate in six male subjects, carbon dioxide elimination decreased significantly from 1.09 plus or minus 0.53 to 0.48 plus or minus 0.18 (ml/min per sq m). Decreased perspiration was observed in the chamber following atropine injection. After application of tepid water to the skin of two atropinized subjects, the carbon dioxide elimination increased to the same level as in the nonatropinized subjects. It appears that increase in the amount of water on or in the skin increases the CO<sub>2</sub> elimination.

(Author)

**A71-30568 Effect of odor composition and environment on olfactory receptor potential of the fly.** Robert E. Kay (Philco-Ford Corp., Newport Beach, Calif.). *American Journal of Physiology*, vol. 220, May 1971, p. 1473-1480. 20 refs. Contracts No. N 00019-69-C-0134; No. N 0019-70-C-0150.

## A71-30569

The olfactory receptor potential of *Lucilia sericata* was used to study the effects of temperature, the mixing of odors, and duration and frequency of odor stimulus on the interaction of odors with olfactory cell membranes. Three potentials may be involved in the response. One is a long-acting negative potential persisting throughout the stimulation, another is a positive potential seen at the start of the stimulus, and the third is a negative pulse at termination of the stimulus. The main negative potential has a low activation energy consistent with a purely physical reaction, whereas the others have larger activation energies and could be related to the mechanism which maintains an asymmetric distribution of ions across the membrane. Responses to mixtures of two odors indicate that the odors interfered with each other. Multiple and prolonged odor stimulations showed that the processes responsible for the receptor potential are completely reversible and capable of existing in several steady-state levels that are determined by the odor environment.

(Author)

**A71-30569 Olfactory unit potentials and receptor potential responses of *Lucilia sericata*.** Robert E. Kay (Philco-Ford Corp., Newport Beach, Calif.). *American Journal of Physiology*, vol. 220, May 1971, p. 1481-1487. 27 refs. Contracts No. N 00019-69-C-0134; No. N 0019-70-C-0150.

Olfactory receptor potentials and unit potentials in response to stimulation by specific odors were recorded from the fly. The receptor potentials were always negative. Within homologous series of n-alkyl alcohols and hydrocarbons, optimal electrophysiological thresholds (sensitivities) were found for compounds of intermediate length (C-8 hydrocarbon, C-7 alcohol) with thresholds increasing sharply for either higher or lower homologues. Patterns of firing of unit potentials were very diversified with respect to odor concentrations, homology, and specificity. Individual cell firings could increase, decrease, or remain the same in response to an odor stimulus. Changes in the firing pattern produced by hydrocarbons were brought about by lower concentrations of compounds of intermediate chain length than by homologues of either shorter or longer length, thus reflecting the relations established by receptor potentials. No such simple relationship was observed for alcohols. It was concluded that olfactory cells supply data about odor concentration and quality in a nonuniform manner and, therefore, the cells act as a sensor array, each piece of which contributes information which is then fabricated into an odor description.

(Author)

**A71-30708 T wave abnormalities in the electrocardiograms of top-ranking athletes without demonstrable organic heart disease.** Nora Hanne-Paparo, Daniel Brunner (Tel Aviv University, Tel Aviv, Israel), and Martin H. Wendkos. *American Heart Journal*, vol. 81, June 1971, p. 743-747. 16 refs.

Over a period of three years since the discovery of the ECG abnormalities, the seven Israeli athletes investigated have continued to participate regularly in their sport and, consistently, have been able to maintain a record of outstanding performance in competitive games. In four instances, a standardized exercise test abolished the T wave abnormalities, but, with one exception, the normalization of the T waves resulting from this maneuver did not persist for longer than 2 min. It has been suggested that, in the three remaining cases, a more strenuous exercise test than the one customarily employed might have been followed by a reversal of the T waves. The meaning of the ECG abnormalities in this group of athletes is still not completely understood but it is suspected that they represent a benign ECG phenomenon due to increased vagal tone in conjunction with shifts in myocardial potassium content.

M.M.

**A71-30709 Left ventricular power in man.** Harold O. Russell, Jr., C. McGavock Porter, Morris Frimer, and Harold T. Dodge (Alabama, University, Birmingham, Ala.). *American Heart Journal*, vol. 81, June 1971, p. 799-808. 29 refs. PHS Grant No. HE-11310.

Description of studies in which left ventricular power is computed as the product of left ventricular pressure and rate of

change of left ventricular volume. Accordingly, the parameters of pressure or resistance to ejection and rate of left ventricular ejection are included. Also, power as computed from left ventricular pressure and volume data has made it possible to determine peak power values in patients with valvular heart disease including mitral insufficiency and aortic valve stenosis, and to relate these values to end-diastolic volumes (EDV) and mass. It is pointed out that, because the calculated power includes not only the volume change, but also pressure and rate of volume change, peak power may well provide a better measure of myocardial performance than systolic ejection fraction per se.

M.M.

**A71-30809 \* Adrenocortical control of epinephrine synthesis.** Larissa A. Pohorecky and Richard J. Wurtman (MIT, Cambridge, Mass.). *Pharmacological Reviews*, vol. 23, no. 1, 1971, p. 1-35. 262 refs. PHS Grant No. AM-11237; Grant No. NGR-22-009-272.

Description of the morphology and biochemistry of the adrenal medulla, the experimental evidence that its ability to synthesize epinephrine is controlled by glucocorticoid hormones, and the physiological evidence that this control mechanism actually operates in the normal mammal. Chromaffin cells in the adult mammal, the mammalian adrenal, PNMT introduction by glucocorticoids, the theoretical relationship between glucocorticoid concentration and PNMT activity, and the selective secretion of epinephrine or norepinephrine from the adrenal medulla are studied. Suggestions are made for the control of PNMT activity in man.

F.R.L.

**A71-30930 \* An eight channel micropowered PAM/FM biomedical telemetry system.** D. E. Olsen, A. Firstenberg, S. W. Huston, L. R. Dutcher, and W. R. Adey (California, University, Los Angeles, Calif.). In: NTC '71; Institute of Electrical and Electronics Engineers, National Telemetering Conference, Washington, D.C., April 12-15, 1971, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1971, p. 308-312. PHS Grant No. GM-16058-04; Contracts No. AF 44(620)-70-C-0027; No. NSR-05-007-158; Grant No. NGR-05-007-195.

An eight channel micropowered, miniature, PAM/FM biomedical telemetry system combines low noise integrated circuit operational amplifiers with low power complementary symmetry metal oxide semiconductors in a thick film hybrid package. The system, designed for implantation in a chimpanzee, planned as a research subject aboard an orbiting space station, has widespread research and clinical applications. Each of eight biopotential signals are amplified differentially using three IC operational amplifiers, two of which are connected as input stages in a voltage follower configuration with their outputs capacitively coupled to the third IC which serves as the gain stage. The analog outputs are sampled sequentially by a multiplexer comprised of CMOS analog gates and digital integrated circuits and are then summed to form a single PAM wavetrain. The transmitter consists of a low power, single transistor, Vackar oscillator which is isolated from the load by a power amplifier stage. The oscillator is frequency modulated with a varactor diode that replaces one of the tank circuit capacitors. The entire system was packaged into two modules, (1) amplifiers and multiplexer, and (2) transmitter and batteries, in order to avoid cross coupling of rf within the hybrid package and to provide maximum system application flexibility. The amplifiers and multiplexer were combined in a hybrid thick film package on a circular aluminum substrate 6.35 cm in diameter by 0.97 cm thick.

(Author)

**A71-31003 \* Variations in the localization of acetyl-coenzyme A synthetase in aerobic yeast cells.** Harold P. Klein and Linda Jahnke (NASA, Ames Research Center, Exobiology Div., Moffett Field, Calif.). *Journal of Bacteriology*, vol. 106, May 1971, p. 596-602. 24 refs.

In cells of *Saccharomyces cerevisiae* growing aerobically for 24 hr, acetyl coenzyme A synthetase was localized principally in the microsomal fraction. On density gradients, the enzyme in such cells behaved as a low-density particle, readily separable from the soluble

proteins. By using density gradients, two forms of synthetase were obtained from these cells: one band denser and the other band less dense than intact mitochondria.

M.V.E.

**A71-31093** Head-mounted display/control system in V/STOL operations. Dora Dougherty Strother and Hubert W. Upton (Bell Helicopter Co., Fort Worth, Tex.). *American Helicopter Society, Annual National V/STOL Forum, 27th, Washington, D.C., May 19-21, 1971, Preprint 532*. 11 p. 14 refs. Members, \$1.25; nonmembers, \$2.00.

Description of a head- or helmet-mounted display technique which can augment or replace existing instruments and displays. It is effective in presenting information in head-up form for flight information, navigation, fire control, and approach and landing during low visibility conditions. It can be used by any crew member and has been designed to decrease pilot workload and training by presenting low-visibility information in a heads-up wide-angle view. In addition to the head-mounted display, the system includes a head position tracking mechanism and a turret-mounted sensor in the nose of the aircraft. Discussions of information requirements are included which describe techniques for presenting pilot percepts of extracockpit visual information.

F.R.L.

**A71-31135 #** The effect of sympathetic nerve stimulation on pulmonary blood volume in isolated perfused lungs. P. Aarseth, G. Nicolaysen, and B. A. Waaler (Oslo, Universitetet, Oslo, Norway). *Acta Physiologica Scandinavica*, vol. 81, Apr. 1971, p. 448-454. 11 refs. Research supported by the Norwegian Council on Cardiovascular Diseases and the Nansen Foundation.

Stimulations of the vago-sympathetic nerve trunk at 5-10 imp/sec have been carried out in isolated dog lung preparations perfused at constant volume inflow. When the left atrial pressure was kept at 3-4 cm of water, the predominant response to these stimulations was a weight reduction of the preparation. This response is interpreted as being due to a reduction in pulmonary blood volume. Nerve stimulations caused only small weight reductions, or even weight augmentations, when the left atrial pressure was at or near zero. The blood volume reductions resulting from nerve stimulations appeared to be mediated via sympathetic nerve fibres and an alpha-receptor mechanism.

(Author)

**A71-31136 #** Pyruvate and lactate ratios in muscle tissue and blood during exercise in man. Jan Karlsson (Gymnastik- och Idrottshögskolan, Stockholm, Sweden). *Acta Physiologica Scandinavica*, vol. 81, Apr. 1971, p. 455-458. 10 refs. Research supported by the Swedish Medical Research Council.

To study the changes by exercise in the relationships between pyruvate (Py) and lactate (La), their concentrations were determined in muscle biopsy specimens and in blood in eight subjects at rest, after submaximal, and after maximal bicycle exercise. La/Py ratios obtained are presented. It is proposed that the observed increase in the muscle Py concentration during exercise cannot account for more than a very minor part of the muscle La concentration, which means that the excess lactate is of very minor physiological importance.

O.H.



## STAR ENTRIES

**N71-24411#** Army Test and Evaluation Command. Aberdeen Proving, Md.

**OXYGEN AND PROTECTIVE MASKS (AVIATION) Final Report**

25 Jan. 1971 27 p refs

(AD-719105; MTP-7-3-086) Avail: NTIS CSCL 6/11

Procedures are described for evaluating the suitability of oxygen and protective masks in an aviation environment.

Author (GRA)

**N71-24412#** Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

**APPLICATION OF RADIOISOTOPES TO WATER RECOVERY SYSTEM FOR EXTENDED MANNED AEROSPACE MISSIONS Final Report, Apr. 1968–Mar. 1970**

Courtney A. Metzger Aug. 1970 24 p refs

(AD-718965; AMRL-TR-70-31) Avail: NTIS CSCL 6/11

Research conducted to obtain a process and system design for the recovery of potable drinking water from human waste during extensive space flights revealed that the most promising process required considerable thermal energy for satisfactory operation. The large consumption of electrical energy prohibits system acceptability when the energy drain is on the vehicle electrical supply system. To meet the need for thermal energy, radioisotopes were investigated and found to conform with the known requirements. The review of previous research on water recovery systems, the design and development of the Air Force modified system, and detailed data on two (36 and 39 day) tests with the isotopes in place supplying the total thermal energy is presented in the report. The complex system is considered a technological breakthrough and for the first time, a radioisotope fueled system is programmed for a 90-day manned chamber test, recovering drinking water from human waste for consumption by four crewmen during the experiment.

Author (GRA)

**N71-24413#** Texas Univ., Austin. Electronics Research Center.

**CAPACITIVE ELECTROCARDIOGRAPH ELECTRODES**

Henry Grady Rylander, III, P. C. Richardson, H. L. Taylor, and F. B. Vogt 4 Sep. 1970 123 p refs

(Grant AF-AFOSR-1792-69)

(AD-718958; AFOSR-70-2431TR; TR-99) Avail: NTIS CSCL 6/2

A discrete capacitive electrode system and a hybrid capacitive sensor system were constructed and evaluated. Most of the fundamental characteristics of capacitive electrodes were ascertained with a discrete component system because all of the system parameters could be varied easily. A hybrid capacitive sensor system evolved as the optimized version of the discrete capacitive electrode system. The principal component of all the capacitive electrodes was a silicon-silicon oxide half-capacitor. The half-capacitor and the skin formed a capacitor when the capacitive electrode was pressed against the skin. The effective capacitance formed by the discrete capacitive electrodes and human skin was large enough to obtain adequate low-frequency response when large amplifier input resistances were used.

Author (GRA)

**N71-24414#** Texas Instruments, Inc., Dallas. Equipment Group.  
**ADVANCED SURVIVAL AVIONICS DEVELOPMENT STUDY Final Report, Aug. 1969–Mar. 1970**

Charles F. Whistler, John P. Aasterud, Richard L. Clark, and Wayne M. Hoover Wright-Patterson AFB, Ohio SD Sep. 1970 117 p refs

(Contract F33657-70-C-0213)

(AD-715310; TI-07-966500-07; ASD-TR-70-27) Avail: NTIS CSCL 6/7

The gross system parameters for post-1975 Search and Rescue (SAR) avionics equipment were developed through a synthesis procedure that combined the results of surveys conducted with personnel engaged in various phases of SAR activities, a statistical investigation of SAR operations, and knowledge of the state of present and developing technology. One of the major conclusions reached was that the gross system parameters must be specified with respect to lowering the probability that the total SAR mission time will exceed two hours. Recommended parameters applicable to a system serving both combat and noncombat military SAR missions as well as civilian SAR missions included: a continuous world-wide distress monitoring system operating on 121.5 MHz and providing one- to two-mile position accuracy, a homing beacon with a 25-mile range operating on 121.5 MHz, and automatic activation of the signaling device(s). Additional features required for combat SAR missions included: voice communications on 243 MHz, nonvoice identification capability, and covert signaling facility. The primary design emphasis for personal equipment should be placed upon reliability and ease of operation.

Author (GRA)

**N71-24436\***# Wisconsin Univ., Madison.

**BIOCIDAL EFFECTS OF SILVER Final Technical Report**

Dean O. Cliver, Wesley K. Foell, and John M. Goepfert Feb. 1971 64 p

(Contract NAS9-9300)

(NASA-CR-114978) Avail: NTIS CSCL 060

The ability of silver ions to kill or inactivate microbial and viral agents in very pure water and possible application to the design of future spacecraft water systems is discussed. Salts of silver were employed in many of these experiments, but silver from an electrolytic ion generator was used when possible. Fairly extensive results of sampling previous prototypes and spacecraft water systems were available to guide the choice of test organisms. Many of the bacteria were laboratory or prototype strains, but some had actually been isolated from water systems. The viruses were selected very arbitrarily to represent several groups. There had been no previous effort to detect viruses which might be present in spacecraft water systems, but at least two of the groups represented here are detected fairly frequently in community wastewater.

Author

**N71-24437#** Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio

**HUMAN PERFORMANCE AS A FUNCTION OF DIRECTION AND FREQUENCY OF WHOLE BODY VIBRATION Final Report, Sep. 1968–Sep. 1969**

Richard W. Shoenberger Oct. 1970 24 p refs

(AD-719745; AMRL-TR-70-7) Avail: NTIS CSCL 5/10

Human performance on a task complex made up of two-dimensional compensatory tracking and visual discrimination reaction time was measured during sinusoidal vibration in each of the three major translational axes (X, Y, and Z). A separate experiment was conducted for each axis, with the subjects seated upright in all experiments. Frequencies tested in each axis were 1, 3, 5, 8, and 11 Hz, at 0.2g and 0.4g. Duration of vibration at each frequency was 9 minutes. Y-axis vibration produced pronounced decrements in both tracking and reaction time with the greatest interference occurring at 3 Hz and 1 Hz, and the least at 11 Hz. For the X and Z axes low-frequency effects were smaller and performance curves across frequency, for constant g levels, were flatter with slightly greater effects at 5 Hz. Horizontal and vertical

## N71-24453

component scores for the tracking tasks were analyzed with regard to mechanical interference effects for each direction of vibration, and an analysis of frequency effects was made in relation to body resonance phenomena.

Author (GRA)

**N71-24453#** Army Test and Evaluation Command, Aberdeen Proving Ground, Md.

### HUMAN FACTORS Final Report

11 Dec. 1970 25 p refs

(AD-719108; MTP-7-3-510) Avail: NTIS CSCL 5/5

Human factor considerations applicable to aviation armament and avionics are described.

Author (GRA)

**N71-24454\***# TRW Systems Group, Redondo Beach, Calif. Guidance and Control Systems Dept.

### ARTIFICIAL GRAVITY SPACE STATION PHYSIOLOGICAL EFFECTS AND DESIGN CRITERIA

J. E. Earl 15 Apr. 1971 65 p refs

(Contract NAS9-8166)

(NASA-CR-114982; TRW-17618-H125-RO-00) Avail: NTIS CSCL 06P

A review was conducted from available literature of physiological effects on man in a rotating environment. To this was added the requirements and constraints that will be imposed by a revolving space station to develop design criteria for an artificial gravity spacecraft. These criteria relate to dynamic and geometric properties in spacecraft design that must be limited in order to provide an environment within which man can be safe, feel comfortable, and perform well. Further, the design criteria proposed increases the maximum spin rate from 4 to 6 rpm, places no upper limit on the radius of rotation, and provides design limits for additional parameters such as angular acceleration, angular jerk, vibration, and noise.

Author

**N71-24455\***# Whirlpool Corp., St. Joseph, Mich. Life Support Systems Group.

### ZERO GRAVITY CLOTHES WASHER Final Report

John J. Symons Feb. 1971 26 p

(Contract NAS9-10934)

(NASA-CR-114983) Avail: NTIS CSCL 06K

The design, development, fabrication, and testing of an approximate half-scale demonstration model of a clothes washer is submitted. It utilizes principles of fluidics to provide washing action, and has the capability to function under conditions of zero gravity. This unit demonstrates decreased weight and complexity as compared to washers with mechanically driven agitators. Reduction of the number of components results in higher reliability.

Author

**N71-24456#** Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany). Inst. fuer Flugmedizin.

### QUANTITATIVE ANALYSIS OF GAMMA AMINO BUTYRIC ACID IN BRAIN EXTRACTS AFTER LONG LASTING COMPULSIVE LOCOMOTION AND BREATHING OF PURE OXYGEN [QUANTITATIVE ANALYSE VON GAMMA AMINO BUTTERSAEURE IN GEHIRNEXTRAKTEN NACH LANGDAUERNDER ZWANGSLOKOMOTION UND ATMUNG VON REINEM SAUERSTOFF]

Gerhard Schaefer and Jean-Claude Delhaye Jan. 1971 24 p refs in GERMAN; ENGLISH summary  
(DLR-FB-71-03) Avail: NTIS; DFVLR Porz: 6.70 DM

The transmission reaction at the synapses, the key structures of the nervous system, are caused by means of chemical transmitter substances. Amongst these substances, gamma amino butyric acid (Gaba) seems to be responsible for the lowering of the excitatory state of the postsynaptic cell. In the organism, this amino acid is

formed and disintegrated purely in the metabolism of the nerve cell, so that its synthesis and utilization are of special importance for the excitatory condition of the whole nervous system. The influence of REM-sleep deprivation and/or hyperbaric oxygenation (1 atm absolute) on Gaba-concentration is investigated in animal experiments. The change caused by REM-sleep deprivation stands in direct relationship to the effect induced by 5-hydroxy tryptamine (serotonin). The change induced by breathing of pure oxygen may probably be regarded as a protective mechanism against oxygen intoxication.

Author (ESRO)

**N71-24460#** Army Test and Evaluation Command, Aberdeen Proving Ground, Md.

### CLOTHING (AVIATION) Final Report

23 Dec. 1970 24 p refs

(AD-719106; MTP-7-3-087) Avail: NTIS CSCL 6/17

Test procedures are described to determine the degrees and forms of protection, and the relative comfort and functional performance of flight crew member clothing.

Author (GRA)

**N71-24466#** Royal Swedish Academy of Engineering Sciences, Stockholm.

### DEVELOPMENT OF SEPARATION METHODS APPLIED TO BIOCHEMICAL MATERIALS

Arne Tiselius *In its De Laval Mem. Lecture/1970* p 17-33 refs

Avail: NTIS

The development of separation methods applied to biochemical materials is reviewed. Among the methods described are the ultracentrifuge separator, electrophoresis, ion exchanging, and chromatography. These methods are discussed in relation to proteins, amino acids, and gels.

ESRO

**N71-24553\***# Technology, Inc., San Antonio, Tex. Life Sciences Div.

### THE METABOLISM OF INGESTED PEROXIDES Final Report, 1 May 1970 - 30 Apr. 1971

Brian Ward and Margaret Smith Apr. 1971 16 p ref

(Contract NAS9-10826)

(NASA-CR-114998) Avail: NTIS CSCL 06P

A rat feeding program to study growth patterns in albino laboratory rats having balanced diets differing by the presence of either oxidized or unoxidized fat is presented. The control group rats of both sexes, which were fed unoxidized lard, consistently gained more weight than did the test group which ate the oxidized lipid diet. The food consumption generally correlated directly with body weight gain. The male rats, of both the test and control groups, ate more food and gained more weight than did the females. The control males, with the unoxidized fat diet, ate about 8% more food than the test males with the oxidized fat diet, and gained 18% more weight. The control females ate approximately the same amount of food as the test females and gained 9% more weight.

Author

**N71-24584\***# Techtran Corp., Glen Burnie, Md.

### INVESTIGATIONS INTO THE GROWTH OF BACILLUS COLI BY DIRECT MICROSCOPIC OBSERVATION. THE PERIODICITY OF BACTERIOPHAGE ACTIVITY STUDIED ON THE BASIS OF THE OBSERVATIONS MADE IN THE COURSE OF THESE EXPERIMENTS [DURCH DIREKTE MILROSKOPISCHE BEOBEAHTUNG AUSGEFUEHRTE UNTERSUCHUNGEN UEBER DAS WACHSTUM DES COLI-BAZILLUS. DIE PERIODIZITAET DER BAKTERIOPHAGENWIRKUNG, VON DEN BEI DIESEN UNTERSUCHUNGEN GEMACHTEN REOBACHTUNGEN AUS UNTERSUCHT]

K. A. Jensen Washington NASA May 1971 45 p refs Transl. into ENGLISH from Centralblatt fuer Bakteriol., v. 107, no. 1-3, 1928 p 1-34

(NASA-TT-F-13652) Avail: NTIS CSCL 06M

After a brief survey and critique of the various methods of quantitative determination of bacterial growth, the most important works on conditions of bacterial growth are discussed. A technique is described which is based on Oerskov's pure-culture method by which it is possible to describe and measure bacterial growth by direct microscopic observation. Author

**N71-24606\*** National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

#### PHONOCARDIOGRAM SIMULATOR Patent

John M. Keefer, inventor (to NASA) Issued 28 Apr. 1970 (Filed 19 Dec. 1967) 5 p Cl. 35-17; Int. Cl. G09b23/28 (NASA-Case-XKS-10804; US-Patent-3,508,347; US-Patent-Appl-SN-691909) Avail: US Patent Office CSCL 06B

A device for producing electrical voltage waves that simulate the sounds of a human heart is described. This device is used to calibrate phonocardiograms. Block and schematic drawings of the device are submitted. Official Gazette of the U.S. Patent Office

**N71-24623\*** United Aircraft Corp., East Hartford, Conn. Hamilton Standard Div.

#### OMNIDIRECTIONALJOINT Patent

Michael A. Marroni, John C. Hardy, and Mark E. Baker, inventors (to NASA) Issued 23 Jun. 1970 (Filed 7 Oct. 1966) 5 p Cl. 2-21; Int. Cl. B63c11/04 Sponsored by NASA (NASA-Case-XMS-9635); US-Patent-3,516,091;

US-Patent-Appl-SN-586329) Avail: US Patent Office CSCL 06Q

A cord restraint system for pressurized suits includes axially spaced circumferential convolute roots spaced about the axis of rotation of a limb which carry a plurality of restraint sets. Each set includes a cord movable relative to points of attachment which extend from points above and below the bending axis and are pairs each of which are diametrically opposed on the respective convolute roots and each pair being circumferentially spaced 90 deg from each other. The cord is serially laced through each point of attachment. Official Gazette of the U.S. Patent Office

**N71-24627#** Commissariat a l'Energie Atomique, Fontenay-aux-Roses (France). Centre d'Etudes Nucleaires.

**PHYSIOLOGICAL DATA ON SWINE FOR USE IN RADIOPHYSIOLOGY: PLASMA AND BLOOD VOLUMES [DONNEES PHYSIOLOGIQUES SUR LE PORC UTILISABLES EN RADIOPHYSIOLOGIE: VOLUME PLASMATIQUE ET VOLUME SANGUIN]**

Jacques Remy, Bernard Perdereau, and Pierre Nizza Jun. 1970 16 p refs In FRENCH

(CEA-R-4031) Avail: AEC Depository Libraries

Plasma and blood volumes of Corsican swine were measured using dilution with Evans blue (T 1824). A value for plasma volume of 50 ml/kg of live weight was found with a hematocrit of 38. The technique used was compared with those used elsewhere and the results were compared with those published for swine and man. Blood volumes in the animals used in this experiment were lower by one third than the ones measured in humans of the same weight. Red blood cells were labeled with Cr-51 and P-32 for determinations of whole blood volume, and I-131 labeled albumin was used for measuring plasma volume. NSA

**N71-24682#** Navy Experimental Diving Unit, Washington, D.C. **EFFECT OF IMMERSION ON THE EXCHANGE OF OXYGEN IN THE LUNG** Final Report

E. T. Flynn 31 Jan. 1971 13 p refs

(AD-719389; NEDU-RR-1-71) Avail: NTIS CSCL 6/19

Steady state pulmonary gas exchange measurements were obtained in two resting subjects breathing a mixture of helium and oxygen at a simulated depth of 5 feet of sea water in a hyperbaric chamber. Measurements were obtained first with the subjects in a dry environment and then with the subjects immersed to the chin

in warm water. Immersion was associated with a 1.3-1.7 mmHg increase in arterial carbon dioxide tension, a 13.2-13.3 mmHg decrease in arterial oxygen tension, and a 12.0-15.6 mmHg rise in alveolar-arterial oxygen gradient. Respiratory frequency, minute ventilation, tidal volume, and oxygen consumption remained unchanged. Physiologic dead space decreased slightly in one subject, but remained unchanged in the other. The observed impairment in oxygenation of arterial blood is thought to be related to the development of alveoli in the lung bases with ratios of ventilation to perfusion significantly less than one. Author (GRA)

**N71-24683#** Navy Experimental Diving Unit, Washington, D.C. **INITIAL EVALUATION OF REVISED HELIUM-OXYGEN DECOMPRESSION TABLES** Final Report

John M. Alexander, Edward T. Flynn, Jr., and James K. Summitt 23 Oct. 1970 101 p refs (AD-719388; NEDU-RR-14-70) Avail: NTIS CSCL 6/11

Fifty-four man dives were undertaken to evaluate three representative tables from a revised set of HeO<sub>2</sub> schedules. These tables were calculated using the classical Haldane method and used the set of M values derived by Workman in 1965 as limits. A 33% incidence of decompression sickness occurred using surface decompression procedures. It was subsequently recommended that further testing of the schedules was unwarranted at this time. Further evaluation of the M values was recommended. Author (GRA)

**N71-24684#** Jodon Engineering Associates, Inc., Ann Arbor, Mich.

**APPLICATION OF CINEHOLOMICROGRAPHY TO THE STUDY OF MICROCIRCULATION HEMODYNAMICS** Final Report, 1 Feb. 1968-31 Dec. 1970

Gary A. Vander Haagen and Dana E. Whitlow Feb. 1971 85 p refs (Contract N00014-68-C-0433) (AD-719401) Avail: NTIS CSCL 6/12

Instrumentation was developed for the study of microcirculation hemodynamics and related physiological studies of man and animal. Developed was a complete cineholomicrographic recording and playback system capable of producing holomicrographs of biological specimens at rates up to 50 frames per second on 35mm film. Key system features include a 1.2 micron resolution over the full 3mm by 3mm by 10mm field, use of a high power pulsed argon laser for high speed or time differential holography, high accuracy 35mm film transport for continuous ultra-low jitter recording and playback, delay line assembly for reduction of the laser speckle coherence problem, a fully articulated three-axis microscope system for viewing the reconstructed image, and provision for mounting a 16mm movie camera on the microscope for recording the reconstructed image. Author (GRA)

**N71-24710#** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

**HUMAN RESPONSE IN CLOSED LOOP CONTROL OF DYNAMIC SYSTEMS**

James J. Adams *In its Performance and Dyn. of Aerospace Vehicles* 1971 p 555-577 refs Avail: NTIS HC\$9.00/MF\$0.95 CSCL 05E

A description is given of a model matching method which was used to determine human response in controlling a wide range of vehicles. The use of the resulting models of human response to determine the complete pilot plus vehicle system response is discussed. The implications of the results on system performance are discussed, and several examples in which the answers to engineering problems are obtained are presented. Author

**N71-24727** Rutgers Univ., New Brunswick, N.J. **THE VISUAL PERCEPTION OF ACCELERATED MOTION**

John Frederic Schmerler (Ph.D. Thesis) 1969 159 p

Avail: Univ. Microfilms Order No. 70-10099

Research was undertaken to answer three interrelated questions in regard to how people perceive changes in the rate of motion: (1) why are acceleration and deceleration difficult to perceive, (2) how is the perception of deceleration different from the perception of acceleration, and (3) what are the perceptual processes underlying the perception of motion changes. Five separate experiments were performed using filmed stimulus material, and a variety of response measures, including both categorical judgments and reproductive techniques. Thresholds for perceived motion changes were determined using different ratios of terminal to initial velocity (velocity ratio) for a given rate of acceleration or deceleration, as the independent variable. A brief summary of each experiment is presented.

Dissert. Abstr.

**N71-24728\*** National Aeronautics and Space Administration. Manned Spacecraft Center, Houston, Tex.

**EXTRAVEHICULAR TUNNEL SUIT SYSTEM Patent**

Joseph J. Kosmo and Elton M. Tucker, inventors (to NASA) Issued 3 Nov. 1970 (Filed 12 Sep. 1969) 6 p Cl. 244-1; Int. Cl. B64g1/00

(NASA-Case-MSC-12243-1; US-Patent-3,537,668;

US-Patent-Appl-SN-857445) Avail: US Patent Office CSCL 06K

An extravehicular human work station permitting manual operation in a hostile environment is described. The work station consists of a semi-anthropomorphic assembly attached to the distal end of a tunnel extending from a vehicle wall. The tunnel is of convoluted bellows construction and may be selectively axially expanded or contracted by a system of individually controlled cables. The cables may be operated individually also in order to regulate the angle from which the tunnel axis projects from the vehicle wall.

Official Gazette of the U.S. Patent Office

**N71-24729\*** Baylor Univ., Houston, Tex. Coll. of Medicine.

**EEG SLEEP ANALYZER AND METHOD OF OPERATION Patent**

James D. Frost, Jr., inventor (to NASA) Issued 22 Dec. 1970 (Filed 4 Feb. 1970) 11 p Cl. 128-2.1; Int. Cl. A6115/05 Sponsored by NASA

(NASA-Case-MSC-13282-1; US-Patent-3,548,812;

US-Patent-Appl-SN-8498) Avail: US Patent Office CSCL 06B

An apparatus and method for quantitatively measuring brain activity as an automatic indication of level consciousness is described. Amplitude weighted signals representative of frequency of brain activity are generated and combined to produce a level of consciousness output signal, which signal may be monitored and recorded.

Official Gazette of the U.S. Patent Office

**N71-24730\*** United Aircraft Corp., East Hartford, Conn.

**FORESHORTENED CONVOLUTE SECTION FOR A PRESSURIZED SUIT Patent**

Michael A. Marroni, Jr., inventor (to NASA) Issued 3 Nov. 1970 (Filed 20 Dec. 1968) 5 p Cl. 2-2.1; Int. Cl. A62b17/00 Sponsored by NASA

(NASA-Case-XMS-09637-1; US-Patent-3,537,107;

US-Patent-Appl-SN-785710) Avail: US Patent Office CSCL 06Q

A procedure for constructing pressure suits with an improved convolute section to provide a high degree of mobility is described. A cloth convolute section is provided with extra material so that large angles of flexure may be obtained by foreshortening the lateral restraints on each side of the joint.

Official Gazette of the U.S. Patent Office

**N71-24737\*#** National Aeronautics and Space Administration, Washington, D.C.

**ON THE VARIATIONS OF LEUCOCYTOSIS [UERER DIE VARIATIONEN DER LEUKOCYTOSE]**

A. Goldscheider et al May 1971 96 p refs Trans. into ENGLISH from Z. Klin. Med. (Heidelberg), v. 25, 1894 p 393-448

(NASA-TT-F-13628) Avail: NTIS CSCL 06E

Artificial changes of leucocyte count in the blood are examined in extensive experiments with rabbits. Some of the older (19th

century) theories regarding leuckotasis and leuckocytes are reviewed. Numerous substances were injected into various organs and the changes in the count were observed and analyzed. Some of the older theories are refuted on the basis of the described experiments. The application to human subjects is discussed.

Author

**N71-24738\*** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**SKELETAL STRESSING METHOD AND APPARATUS Patent**

Wayne H. Howard and Donald R. Young, inventors (to NASA) Issued 29 Dec. 1970 (Filed 6 Feb. 1969) 8 p Cl. 128-24; Cl. 128-25; Int. Cl. A61h1/00

(NASA-Case-ARC-10100-1; US-Patent-3,550,585;

US-Patent-Appl-SN-797058) Avail: US Patent Office CSCL 06B

A method and apparatus for applying a predetermined force to the lower leg of a subject experiencing prolonged recumbency or weightlessness are discussed. The subject's foot is placed in a stirrup or shoe means which is connected directly to the rack of a rack and pinion apparatus. A knee plate is also connected to the rack and pinion device by suitable cable means or the like so that by applying a predetermined torque to the pinion a compressive force is applied to the lower leg of the subject between the ankle and knee so as to simulate the forces to which this portion of the leg is normally subjected during ambulation.

Official Gazette of the U.S. Patent Office

**N71-24745#** Civil Aeromedical Inst., Oklahoma City, Okla.

**AVIATION MEDICINE TRANSLATIONS: ANNOTATED BIBLIOGRAPHY OF RECENTLY TRANSLATED MATERIAL, 6**

Ruth Ann Mertens, C. Dene Lacy, D. R. Goulden, and Karen N. Jones Jan. 1971 8 p refs

(FAA-AM-71-5) Avail: NTIS

An annotated bibliography of translations of foreign-language articles is presented. The 22 entries are concerned with studies in aviation medicine, vestibular function, body temperature, color vision, cholinesterase, nystagmus, alcohol, vestibulocolomotor funti, anatomy, stress and air traffic control work, flight stress, anti-smoke hoods, histology, exercise, cardiology, histochemistry, air evacuation, respiration, and toxicology. Procedures for obtaining copies of the translations are included.

Author

**N71-24747#** Civil Aeromedical Inst., Oklahoma City, Okla.

**PHYSIOLOGICAL RESPONSES IN AIR TRAFFIC CONTROL PERSONNEL: O'HARE TOWER**

C. E. Melton, Jr., J. M. McKenzie, B. David Polis, G. E. Funkhouser, and P. F. Iampietro Jan. 1971 17 p refs

(FAA-AM-71-2) Avail: NTIS

Physiological and biochemical measurements were made on 22 air traffic controllers at O'Hare tower during five days of the heavy traffic evening shift (1600-2400) and five days of the light traffic morning shift (0000-0800). Pulse rates were higher on the evening shift than on the morning shift. Converging approaching traffic was more excitatory than departing diverging traffic on the evening shift; there was no differential response on the morning shift. Galvanic skin response indicated that adaptation to the morning shift was incomplete in five days. Fibrinogen levels in controllers' blood was not elevated above the expected level for their age group. Controllers had a higher total plasma phospholipid concentration than populations of normal people, schizophrenics and combat pilots. Phosphatidyl glycerol was significantly higher in controllers' plasma than in the normal population but less than in the combat and schizophrenic populations. Findings from urine analyses that are reported separately by Hale, et al., have been summarized in this report. Urine chemistry shows that catecholamine excretion is related to the number of aircraft operations. Corticoid excretion rises late in the morning shift and recovery from morning shift work is incomplete during the off-duty rest period.

Author

**N71-24748# Civil Aeromedical Inst., Oklahoma City, Okla.  
USE OF SKIN TEMPERATURE TO PREDICT TOLERANCE  
TO THERMAL ENVIRONMENTS**

P. F. Lampietro Jan. 1971 9 p refs  
(FAA-AM-71-4) Avail: NTIS

Skin temperature is a sensitive index of the effect of the thermal environment on the seminude man. Skin temperatures and tolerance times for several studies have been utilized in an attempt to establish a relationship between (1) final skin temperature and tolerance time and (2) skin temperature during the early minutes of exposure and final skin temperature. The number of subjects during each exposure ranged from five to ten. Exposure temperatures ranged from -4 deg to 113 C. (25 to 235 F.). Air movement ranged from about 50 to 880 ft/min. A relationship exists between final temperature and tolerance time and between final skin temperature and skin temperature at ten minutes of exposure. Final skin temperature (at tolerance) in hot and cold environments can be predicted from the skin temperature at ten minutes. Tolerance time may also be estimated from the ten minute skin temperature.

Author

**N71-24763# Harvard Univ., Cambridge, Mass.**

**POTENTIAL CONSEQUENCES OF EXPERIMENTATION  
WITH HUMAN EGGS**

James D. Watson *In Comm. on Sci. and Astronaut. (U. S. House)*  
Intern. Sci. Policy Feb. 1971 p 149-161 refs  
13-34)

Avail: SOD \$0.75

The aspects of human embryogenesis and population control are analyzed in detail by considering test tube growths of human eggs and human clonal reproduction. It is desirable that as many people as possible are informed about the new ways of human reproduction and their potential consequences so that a formal legislative level can be reached about the many problems that are bound to arise if test tube conception becomes a common occurrence. Some form of international agreement is absolutely necessary before the possibility of having a free choice in human reproduction is gone.

G.G.

**N71-24889# Atomic Energy of Canada, Ltd., Chalk River (Ontario). Nuclear Labs.**

**BIOLOGY AND HEALTH PHYSICS DIVISION PROGRESS  
REPORT, 1 APRIL - 30 JUNE 1970**

30 Jun. 1970 52 p refs  
(AECL-3728; PR-B-86) Avail: AEC Depository Libraries; Atomic Energy of Can., Ltd., Chalk River: \$1.50

The research and routine monitoring activities of the Biology and Health Physics Division of AECL for the period of April 1 to June 30, 1970 are summarized. The various branches within the division and their major areas of study include: Biology Branch; biochemical and molecular studies, and developmental and population genetics studies; Environmental Research Branch; biological and physical studies, meteorological studies, chemical studies, and soil studies and radiochemical analysis. Health Physics Branch; dosimetry, detector, and monitoring instrumentation studies. The economic importance to AECL of the seasonal and geographic variations in the deuterium content of Canadian waters is discussed by the division director.

NSA

**N71-24931\*# Stanford Research Inst., Menlo Park, Calif.  
RESEARCH STUDY OF A FUNDUS TRACKER, PHASE 2  
Final Report 18 Jan. 1968-1 Feb. 1971**

D. H. Kelly and H. D. Crane Jan. 1971 45 p refs  
(Contract NAS2-3995; SRI Proj. 6319)  
(NASA-CR-114307) Avail: NTIS CSCL 06P

A stabilization technique based on tracking the edge of a blood vessel in the optic disk is described. A small spot of blue light is imaged on the fundus, and scanned in a circle around the optic disk at high speed. Variations in reflectance along this circular raster are detected by a photomultiplier tube and digitized for further processing. A selected frame of this digital video signal is

stored in a magnetic-core array and correlated with subsequent frames to generate eye-movement information in real time. The correlation algorithm distinguishes horizontal, vertical, and torsional motions of the fundus pattern. Analog displacement signals fed back to a servo-mechanism can thus cause the raster to track the fundus pattern, locking to the position of the selected frame. Such closed-loop signals can be used simultaneously to move a stimulus pattern in stabilized-image experiments.

Author

**N71-24953# School of Aerospace Medicine, Brooks AFB, Tex.  
PARAMETER IDENTIFICATION AS AN AID TO MODELING  
RESPIRATORY SINUS ARRHYTHMIA Final Report, Sep.  
1968-Aug. 1970**

Eric D. Grassman Dec. 1970 21 p refs  
(AD-719860; SAM-TR-70-81) Avail: NTIS CSCL 6/19

A parameter identification scheme utilizing linear programming developed by Reid and Mackay has been applied to modeling the transient heart rate response to short-term respiratory maneuvers. The method was developed specifically for identification of physiologic control mechanisms, and it is especially useful in modeling short-term transient responses due to steplike forcing functions. Parameters of linear heart rate-respiration models have been identified, and the response of the models to training data closely resembles the experimental response. This type of approach, in conjunction with empirical data of other physiologic studies, may yield important information on the mechanism and quantitative relationships involved in the dynamic heart rate response to respiration.

Author (GRA)

**N71-24955# Grumman Aerospace Corp., Bethpage, N.Y. Life  
Sciences Section.**

**THE EFFECT OF AN EXPLICIT RESPONSE REQUIREMENT  
ON VIGILANCE PERFORMANCE**

S. Klier and R. Pain May 1971 19 p refs  
(RM-505) Avail: NTIS

During an 80-minute vigil, subjects in four groups responded to an intensity difference between two successively illuminated lights. Two factors were investigated: (1) high (1700) versus low (400) rates of stimulus presentation; and (2) an additional response to all stimuli as well as signals (active) versus response only to signals (passive). The active condition represented an attempt to demonstrate an explicit observing response connected with signal detection. Results showed significantly better detection for the low rate condition and a nonsignificant tendency for better performance for the active condition. There was no evidence for the coincidence of missed signals and inappropriate additional responses. The results are interpreted in terms of a reinforcement of observing response theory and are related to problems of motivation during long term monitoring.

Author

**N71-24997# Air Force Systems Command, Wright-Patterson  
AFB, Ohio. Foreign Technology Div.**

**HOMEOSTASIS IN WEIGHTLESSNESS**

B. B. Egorov 2 Nov. 1970 17 p Transl. into ENGLISH from  
Proc. of 21st Intern. Astronautical Congr., Constance (USSR),  
4-10 Oct. 1970 p 1-14  
(AD-719790; FTD-HT-23-777-70) Avail: NTIS CSCL 6/19

The effect of absence of gravity on regulatory reflexes is discussed from the point of view of a typical cardiovascular and uretic functioning observed in cosmonauts.

Author (GRA)

**N71-25000\*# School of Aerospace Medicine, Brooks AFB, Tex.  
Environmental Sciences Div.**

**FLUID BALANCE IN ARTIFICIAL ENVIRONMENTS: ROLE  
OF ENVIRONMENTAL VARIABLES**

William M. Carleton and B. E. Welch 2 Apr. 1971 240 p refs  
(NASA Order T-74393-G)  
(NASA-CR-114977) Avail: NTIS CSCL 06K

The influences of the most critical environmental parameters on fluid balance and on subjective and objective tolerance to the artificial environment are investigated. Ambient temperature, water vapor pressure, total barometric pressure, wind velocity, and atmospheric gas composition are examined from the following areas

## N71-25001

of human survival and function: insensible water losses and their skin, respiratory, and metabolic components; overall fluid and weight balance, and routes of fluid intake and output; and development of signs and symptoms related to environmental intolerance. The possible mediating roles of other environmental or physiologic variables are also reviewed. Author

**N71-25001\***# Whirlpool Corp., St. Joseph, Mich. Life Support Systems Group.

**DEVELOPMENT OF COMPRESSED NONSWEET, FLAVORED SNACK FOODS TO BE USED IN THE APOLLO FOOD SYSTEM** Final Report, 5 Jan. 1970 - 30 Apr. 1971

Robert W. Larson 30 Apr. 1971 17 p  
(Contract NAS9-9032)

(NASA-CR-114996) Avail: NTIS CSCL 06H

The development of several flavored snack cube items based on the cheese cracker formulation is described. The formulations were compressed, coated, freeze dried, and evaluated for flavor, texture, and appearance. A part of each acceptable formulation was stored for 3 hours at 135 + or - 5 F, and a part for four weeks at 100 + or - 5 F. Samples of stored and unstored cubes were compared. Pizza, chicken, bacon, barbecue, ham and swiss, parmesan, and blue cheese flavors were selected for initial formulation, and samples of the last four were submitted to NASA for evaluation.

N.E.N.

**N71-25035\***# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**AN AUTOMATED LUCIFERASE ASSAY OF BACTERIA IN URINE**

G. L. Picciolo, B. N. Kelbaugh, E. W. Chappelle, and A. J. Fleig Apr. 1971 24 p refs

(NASA-TM-X-65521; X-641-71-163) Avail: NTIS CSCL 06P

A method is described for the direct cell count of bacteria in urine specimens based on the bioluminescent reaction of luciferase when mixed with ATP. Comparative tables are presented of the results obtained from selected urine samples by the ATP assay and those obtained by culture-colony count and by the pour plate technique. These results demonstrate that the number of bacteria calculated by ATP measurements is much higher than by the other two methods. In addition, the design and operation of an automated instrument is described which performs the ATP assay in 15 minutes. After the luciferase is injected into a specimen, the vial passes in front of a photomultiplier-amplifier system that detects any light emitted and converts this light into a signal to a strip-chart recorder. The readout is a peak showing the amount of light emitted from the specimen, the height of the peak correlating to the amount of ATP, and thus to the amount of bacteria in the specimen.

D.L.G.

**N71-25086\***# School of Aerospace Medicine, Brooks AFB, Tex. **METHOD FOR ASSESSING A-WEIGHTED AUDITORY RISK LIMITS FOR PROTECTED EARS** Final Report, May-Oct. 1970

Donald C. Gasaway and Harrell C. Sutherland, Jr. Jan. 1971 17 p refs

(AD-719861; SAM-TR-71-1) Avail: NTIS CSCL 6/10

Recent noise exposure studies employ A-weighted measures as the basis for estimating varying degrees of potential auditory risk. Since most auditory risk criteria are based on unprotected exposures, aerospace applications require adapting the criteria to attenuated conditions. The report provides specific guidance for evaluating conditions of noise exposure when personal ear protection is worn (headsets or earplugs). Generalized spectra are presented for noise measured within cockpits of 249 aircraft divided into eleven groups, each representing a different airframe-to-powerplant mating. A-weighted levels for attenuated and nonattenuated noise are shown for each of the eleven groups of aircraft included in this study. Relationships between C- and A-weighted values for different spectra (octave bands) are described, and the use of C-A as a correction factor is evaluated.

Author (GRA)

**N71-25087\***# Aeronautical Systems Div., Wright-Patterson AFB, Ohio.

**DEVELOPMENT OF TRACKING ERROR FREQUENCY RESPONSE FUNCTION AND AIRCRAFT RIDE QUALITY DESIGN CRITERIA FOR VERTICAL AND LATERAL VIBRATION** Final Report, 1 Jan. 1969 - 1 Aug. 1970

John W. Rustenburg Jan. 1971 92 p refs

(AD-719754; ASD-TR-70-18) Avail: NTIS CSCL 5/10

The report presents the results of a study of available experimental literature in order to more clearly define the shape of frequency response functions for human psychomotor performance under vertical and lateral vibration conditions. The performance frequency response functions as developed are based on a constant tracking error and are used in the calculation of a human performance index for some aircraft. Evaluation of human performance index values and associated crew effectiveness estimates are used to determine ride quality criteria in terms of exposure time and crew tolerance levels for vertical, lateral, and combined-axes vibration inputs. A comparison was made of the shape of vertical and lateral performance curves derived in the study with vertical and lateral objectionable discomfort curves derived independently for commercial transport passenger ride quality criteria development. By allowing for soft seat versus hard seat responses, close general agreement in the shapes of the frequency response curves is noted.

Author (GRA)

**N71-25099\***# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

**REGENERATION OF SPACESHIP CABIN ATMOSPHERES BY MEANS OF UNICELLULAR ALGAE**

G. I. Meleshko 4 Nov. 1970 11 p refs Transl. into ENGLISH from Proc. of 21st Intern. Astronautical Congr., Constance, 4-10 Oct. 1970 p 1-8

(AD-719831; FTD-HT-23-776-70) Avail: NTIS CSCL 6/11

The development of air regeneration systems utilizing photosynthesis of unicellular algae appears feasible due to efficiency of current bioengineering systems used for Chlorella cultivation and possibility of assuring stable performance of the systems. The efficiency of cultivation procedures used at present is achieved first of all by re-use of the culture medium without its intermediate treatment in adjacent components of the system. Stability of the system is related to biological peculiarities of the biological material (population involving specimens of different age and high reproduction rate) and can be maintained by certain techniques.

Author (GRA)

**N71-25146\***# Royal Aircraft Establishment, Farnborough (England).

**IMPULSE LEVEL (MANIFEST ANXIETY) AND THE RECOGNITION OF PERIPHERALLY INTRODUCED VISUAL STIMULI AGAINST A MOVING BACKGROUND [TRIEBNIVEAU (MANIFESTE ANGST) UND DAS ERKENNEN PERIPHER EINGEFUEHRTER OPTISCHER REIZE UNTER DEM EINFLUSS EINES BEWEGTEN HINTERGRUNDES]**

Werner D. Froehlich Jan. 1971 20 p refs Transl. into ENGLISH from Z. Exp. Angew. Psychol., v. 12, no. 4, 1965 p 570-584

(RAE-LIB-TRANS-1552) Avail: NTIS

From a group of 108 test personnel of ages between 18 and 26 the 12 most anxious and the 12 non-anxious (A and NA) subjects were chosen. Tests were made as to whether, for the group as a whole, movement of the background caused a narrowing of the field of view, that is, a later recognition of peripherally introduced stimuli. This assumption was established. It was found in this connection that the shape of the figures of the peripheral stimuli introduced had a decisive effect on the recognition. Changes or distinctions in the case of A and NA could not be shown with confidence, although two plausible hypotheses are available.

Author

**N71-25240\***# Georgetown Univ., Washington, D.C.

**THE MAGNETIC FIELD COMPONENT OF THE NEURAL IMPULSE** Final Report

John H. Seipel [1970] 13 p refs

(Grant NGR-09-009-005)

(NASA-CR-118334) Avail: NTIS CSCL 06C

The existence of electric and magnetic field components possibly associated with the transmission of neuronal impulses was studied in isolated bullfrog sciatic nerves. The existence of the electric component was easily confirmed. Using detectors sensitive only to magnetic fields, a magnetic component could not be detected at a level equivalent to 0.9 microampere of 5 KHz current. Theoretical analyses of the sodium ion flows associated with the transmission of impulses in these nerves are presented. The absence of a signal at this detectability limit suggests that at least 99.8% of the sodium ion flux conforms to the local circuit theory. It is, however, not possible to conclude that a magnetic impulse, albeit small, does not exist since the confidence level of these experiments is a factor of 1000 greater than the signal predicted from the local circuit theory.

Author

**N71-25241# California Univ., Berkeley. Lawrence Radiation Lab. MEASUREMENT OF OXYGEN EFFECT AND BIOLOGICAL EFFECTIVENESS OF A 910 MeV HELIUM ION BEAM USING CULTURED CELLS (T-1)**

Mudundi R. Raju, Madhvanath Gnanapurani, Bambino Martins, Jerry Howard, and John T. Lyman Nov. 1970 13 p refs Presented at 63d Natl. Meeting of the Am. Inst. of Chem. Engr., Chicago

(Contract W-7405-eng-48)

(UCRL-20190; CONF-701103-7) Avail: NTIS

The depth-dose distribution of a 910-MeV monoenergetic helium ion beam is modified by using a ridge filter in the beam path so that the region of maximum dose is uniform over a distance of about 6 cm of water. The biological effectiveness and oxygen enhancement ratio (OER) at different depths within a rectangular Lucite phantom were measured by using cultured human kidney cells (T-1). The results indicate that the biological effectiveness at the broad peak region is about 1.3 to 1.4 compared with that at the beam entrance, and the OER is found to be about 1.7 to 1.9. This significant reduction in OER even when the beam is modified to cover 6 cm of tissue may be of radiotherapeutic interest in treatment of deep seated tumors containing hypoxic cells.

Author (NSA)

**N71-25326\*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.**

**THE BRAIN AS A MODEL FOR LSI**

James S. Albus *In its Significant Accomplishments in Sci. and Technol. at Goddard Space Flight Center* 1970 p 292-294

Avail: NTIS HC\$6.00/MF \$0.95 CSCL 06P

Component connection schemes of the brain and the resulting data processing capabilities are studied. Visualized are cells with variable strength independent x inputs; if a coincidence occurs between an x2 pulse and a pulse appearing on the in line of the cell, only the x2 connection is charged and all other connections remain unaffected. Connecting these cells into a planar array constitutes a trainable feedback control system model; the system can be trained by a pilot and probably substituted for a human pilot under flight conditions.

G.G.

**N71-25393\*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.**

**HUMAN ACCLIMATION AND ACCLIMATIZATION TO HEAT A Compendium of Research**

John E. Greenleaf and Carol J. Greenleaf Dec. 1970 191 p refs

(NASA-TM-X-62008) Avail: NTIS CSCL 06S

Studies of the mechanisms of short term acclimatization and acclimation to heat are discussed. Additional studies are included that provide background information in the form of reviews or classic descriptions of the process. Wherever possible a detailed annotation is provided under the subheadings: (a) definition of acclimation or acclimatization; (b) purpose of the study; (c) subjects

used; (d) environmental conditions; and (e) results and conclusions. The abstracts cover material through December 1967. The abstracts are listed in alphabetical order by first author and an index is provided. Additional references are provided in the bibliography.

Author

**N71-25438# Oak Ridge National Lab., Tenn.**

**IONIC CONDITIONING OF AIR**

C. G. Invernizzi 1970 15 p refs Transl. into ENGLISH from Proceedings of Conf. on Isotope Radiation Techniques in the Building Industry (Brussels), 28 - 30 Oct. 1970 Sponsored by AEC (ORNL-tr-2427; CONF-701027-2) Avail: NTIS

A review of air ionization and the effects of positive ions in air on man is presented. Information is included on the relations of ionization with pollution of air and the therapeutic properties of ionized air. A method of ionizing air using Am-241 sources is described in which electronically positive ions are collected and repelled by their unipolar charge resulting in a fan-shaped spread area. A selection method is used to emit negative ions into ambient air. If such devices are used in conditioned air they establish equilibrium, and if used in polluted air they promote precipitation of pollutants.

NSA

**N71-25533\*# Martin Marietta Corp., Denver, Colo.**

**MODIFICATION OF AN ASTRONAUT'S MOCK UP TOOL KIT Final Report**

Victor A. DesCamp, Michael W. Hussey, Joseph A. Lenda, and Billy B. Taylor Apr. 1971 162 p

(Contract NAS8-26448)

(NASA-CR-103135; MCR-71-59) Avail: NTIS CSCL 05H

The development is described of astronaut support equipment for use on future missions involving inflight maintenance tasks. Several items of non-flight hardware were developed including an astronaut's tool kit and tools, a repair kit designed to seal leaks in fluid systems, and a fluid removal tool used in the repair of fluid systems. A demonstration test panel was built for inflight maintenance simulation tests using the equipment.

Author

**N71-25551# Oak Ridge National Lab., Tenn.**

**BASIC AND MISSION RESEARCH IN THE BIOLOGICAL SCIENCES AT ORNL**

Peter Mazur Nov. 1970 120 p refs

(Contract W-7405-eng-26)

(ORNL-TM-3218) Avail: NTIS

An analysis of biological research conducted at a military research facility is presented. The subjects discussed are: (1) methods for obtaining support for research projects, (2) effectiveness of communicating mission accomplishments, (3) justification for basic research and research personnel, and (4) potential contributions of scientific personnel in areas outside their immediate research specialties.

P.N.F.

**N71-25559 Defence Research Establishment Toronto, Downsview (Ontario).**

**GUIDE TO NOISE HAZARD EVALUATION**

Stanley E. Forshaw Nov. 1970 43 p refs /ts Rev. Paper No. 771

Copyright. Avail: Issuing Activity

Damage risk criteria for steady state and impulse or gunfire noise are summarized. Information is compiled on: the ISO noise rating number for a continuous noise; the relationship between octave band sound pressure levels measured with standardized filters; the power addition of noise bands expressed in decibels; and noise interference effects on face-to-face speech communications in terms of A-weighted sound pressure levels. Also discussed are: calculation of an equivalent A-weighted sound pressure level from octave band sound pressure levels; maximum allowable daily

## N71-25623

exposure to continuous noise; intermittent steady state noise exposure; hearing protection device attenuation characteristics; peak overpressures in PSI and peak sound pressure levels in dB; and hearing conservation guidelines for certain weaponry. E.C.

**N71-25623#** Michigan Univ., Ann Arbor. Human Performance Center.

### **SPATIAL PROCESSING CHARACTERISTICS IN THE PERCEPTION OF BRIEF VISUAL ARRAYS**

Gerald T. Gardner (Ph.D. Thesis) Aug. 1970 91 p refs  
(Contract AF 49(638)-1736; ARPA Order 461)  
(AD-719797; Rept-08773-64-T; TR-23; AFOSR-TR-71-0438)

Avail: NTIS CSCL 5/10

In the Estes and Taylor (1964, 1966) detection experiments, subjects (Ss) saw a brief array containing noise letters plus one of two critical letters, and attempted to determine which critical letter appeared; accuracy decreased as the number of noise letters increased. This was interpreted by Estes and Taylor and by Rumelhart (1970) as demonstrating a limitation of perceptual capacity. However, the experiments involved confoundings: stimulus arrays with more letters were either larger in visual angle or involved greater inter-letter crowding, both of which factors are known to decrease letter perceptibility. Experiments I and II in this study were patterned after the Estes and Taylor paradigm, but controlled both angular size and crowding factors by means of specially designed stimulus arrays. In both experiments, Ss performance decreased with increases in the number of letters, thus supporting limited-capacity models. Author (GRA)

**N71-25652#** California Univ., Berkeley. Center for Pure and Applied Mathematics.

### **SELF-ORGANIZING SYSTEMS Final Report, 1 Jan. 1961 – 14 Apr. 1969**

Hans J. Bremermann Jan. 1971 9 p refs  
(Contract Nonr-222(85))

(AD-719930) Avail: NTIS CSCL 6/4

The motivation and development of the contract is discussed and the most important results are summarized. They fall into four groups: Fundamental quantum-mechanical and thermodynamical limitations of data processing and the impact of these limitations upon the realization of algorithms, in particular algorithms of self-organization, artificial intelligence, tree search, etc.; The simulation of biological evolution and its connection with optimization and self-organization; The development of efficient non-local optimization algorithms and the application of these optimization algorithms to various practical problems: the solution of systems of non-linear algebraic equations in many variables, analysis of spectra with non-linear superposition, and non-linear systems identifications. Author (GRA)

**N71-25674#** Naval Air Development Center, Johnsville, Pa. Aerospace Medical Research Dept.

### **A REVIEW OF EXPERIMENTAL DATA ON THE CARDIOVASCULAR RESPONSE TO ACCELERATION**

Glen L. Goodhart 31 Dec. 1970 24 p refs  
(AD-719902; NADC-MR-7004;

NAVMED-MF12.524.005-7001-14) Avail: NTIS CSCL 6/19

Controlled physiological responses to gravitational stress is a major concern in cardiovascular simulation. Information pertaining to the physiological effects of positive acceleration on the cardiovascular system has been gathered from the literature and is presented in light of requirements for cardiovascular simulation. Both generalized and long term responses to G stress are considered as well as the transient G studies that were available. Author (GRA)

**N71-25715\*#** Biospherics, Inc., Rockville, Md.

### **IRIS BIOLOGICAL EXPERIMENTS Annual Report, Apr. 1970 – Apr. 1971**

15 Apr. 1971 59 p refs  
(Contract NAS5-11294)

(NASA-CR-118629) Avail: NTIS CSCL 06C

The types of data to be obtained from the Mariner Mars '71 Infrared Interferometer Spectrometer (IRIS) experiment have been examined for the inferential information they may yield regarding the possibility of Martian surface biota. The IRIS will analyze the types and concentrations of trace gas constituents in the Martian atmosphere and, in wavelength regions where no gases absorb, the IRIS will also obtain reflectance data from the surface of Mars. Regarding surface reflectance, our results indicate that neither biological nor organic material exhibit characteristic reflectance signatures in the range of the IRIS other than a black body response. These findings make it unlikely that definitive biological inferences can be drawn from the IRIS reflectance data. However, biological materials will quench the SiO<sub>2</sub> reststrahlen which will readily appear in one IRIS window. Thus, the possibility of inferring biological or organic material by quench of SiO<sub>2</sub> reststrahlen, while remote, does exist. Author

**N71-25716\*#** Techtran Corp., Glen Burnie, Md.

### **OBSERVATIONS OF THE CUPULA IN THE AMPULLAE OF THE SEMICIRCULAR CANALS OF THE LABYRINTH OF A LIVING PIKE [UEBER DIE BEOBUCHTUNG DER CUPULA IN DEN BOGENGANGSAMPUllen DES LABYRINTHS DES LEBENDEN HECHTS]**

W. Steinhausen Washington NASA May 1971 19 p refs  
Transl. into ENGLISH from Arch. Gesa. Physiol. (Berlin), v. 232, 1933 p 500–512  
(Contract NASw-2037)

(NASA-TT-F-13665) Avail: NTIS CSCL 06C

The cupula of the left horizontal ampula and semicircular canal in a living pike was stained and its behaviour was observed during electrical and mechanical stimulation. Electrical stimulation failed to produce any movement of the cupula, and a deviation of the eyes to the right is produced only when the current flow is from the utricle toward the semicircular canal. Current flowing in the opposite direction produces no excitation. Author

**N71-25766#** Institute of Occupational Health, Helsinki (Finland). Dept. of Physiology.

### **THE CONTROL OF HUMAN THERMOREGULATORY HEAT PRODUCTION, PART 2 Final Scientific Report, 1 Apr. 1966 – 30 Nov. 1970**

Pekka Piironen and Kauko Takalo 30 Nov. 1970 33 p refs  
(Contract AF 61(052)-936)

(AD-720831; AFOSR-71-0709TR-Pt-2) Avail: NTIS CSCL 6/16

Experiments were carried out for the study of control of thermoregulatory heat production, in which continuous records were made of the test subjects oxygen consumption and of the different body temperatures. The skin temperature of the subject was controlled during the experiment by conducting temperature-controlled water onto the skin, with the aid of a special exposure suit. In the first experimental series, the subjects skin temperature was kept constant during the test and the blood temperature was allowed to decrease slowly; the results obtained by this procedure were considered to correspond to control in steady state situations. In the second series, the skin temperature was varied in programmed manner. Analysis of the results revealed that both the steady-state and dynamic experiments can not be explained with the same quantitative control assumptions if the hypothalamic and skin temperatures are assumed to be the sole controlling variables. When as a third controlling variable the gradient of skin temperature was taken into consideration, the dynamic experiments could be considerably better accounted for. Author (GRA)

**N71-25789\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **RELATIONS AMONG LOUDNESS, LOUDNESS LEVEL, AND SOUND PRESSURE LEVEL**

Walton L. Howes Washington May 1971 14 p refs  
(NASA-TM-X-2298; E-6107) Avail: NTIS CSCL 20A

Formulas are given which relate the loudness, loudness

level, and sound-pressure level of pure tones, hence of a band of steady noise that does not exceed the critical bandwidth. The formulas apply continuously over most of the acoustic regime and contain no undetermined coefficients. Author

**N71-25792#** RAND Corp., Santa Monica, Calif

**RAND SYMPOSIUM ON PILOT TRAINING AND THE PILOT CAREER Final Report**

W. A. Stewart and E. S. Wainstein Dec. 1970 143 p Symp. held in Santa Monica, Calif., 23-27 Feb. 1970  
(Contract F44620-67-C-0045)

(AD-720797; R-615-PR) Avail: NTIS CSCL 5/9

Contents: The pilot career; Career and education; The pilot skill--definition, measurement, and retention; Relevance of training to combat; Selection; Motivation; Training innovations and the role of research; Simulators; The instructor pilot; Topics for research. GRA

**N71-25840#** Michigan State Univ., East Lansing. Div. of Engineering Research.

**A THEORY OF NEUROMIME NETS CONTAINING RECURRENT INHIBITION, WITH AN ANALYSIS OF A HIPPOCAMPUS MODEL Interim Scientific Report**

Duane G. Leet and William L. Kilmer 29 Jan. 1971 105 p refs

(Grant AF-AFOSR-1023-67)

(AD-720815; AFOSR-TR-71-0705; ISR-15) Avail: NTIS CSCL 6/16

A functal net model of recurrent inhibition as found in the CA3 sector of mammalian hippocampus is presented. The model contains a rank of functals, which are somewhat like adaptive threshold logic units, and a rank of function generators, which are threshold logic units. The most important characteristic of the models input-output transformation is that a single input can be transformed into a sequence of outputs. A trainable functal net is one in which the functions realized by its functals are under the control of an external structure called the trainer, which operates according to a specified algorithm. The CA3 model is incorporated into an automata theoretic model of the hippocampus that is designed to take advantage of certain of the CA3 models properties. The function realized by a functal system model whenever it is placed in a new environment is called the initial function. The selection of initial functions is discussed, and an algorithm is derived to select them automatically. Author (GRA)

**N71-25841#** Michigan State Univ., East Lansing. Div. of Engineering Research.

**AN INTRODUCTION TO MULTICLASS PATTERN RECOGNITION IN UNSTRUCTURED SITUATIONS Interim Scientific Report**

Albert Y. Hung and Richard C. Dubes 10 Dec. 1970 71 p refs

(Grant AF-AFOSR-1023-67)

(AD-720812; AFOSR-TR-71-0710; ISR-12) Avail: NTIS CSCL 6/4

The M-class pattern recognition problem is to construct a set of discriminant functions which partition a feature space into M regions, one region per pattern class. Each point in the feature space is a potential pattern and each pattern represents an object. Almost nothing is assumed about the origins of the patterns. Distributions are not associated with the pattern classes. A set of training patterns is to be generalized into a set of discriminant functions which classify the potential patterns. The fundamental algorithms developed here concern the situation where the origin of each training pattern is known. An extension to the unsupervised case is also given. Several new multi-class decision-making algorithms are proposed. An entirely new class of algorithms is obtained by translating the pattern recognition problem into the problem of minimizing a function of several variables and selecting suitable

functions. This general formulation includes most known algorithms as special cases. The class of algorithms includes all procedures which approximate discriminant functions by linear combinations of basis functions. Several sucessful two-class algorithms are extended to the M-class problem. Author (GRA)

**N71-25842#** Michigan State Univ., East Lansing. Div. of Engineering Research.

**INFORMATION COMPRESSION, STRUCTURE ANALYSIS, AND DECISION MAKING WITH A CORRELATION MATRIX**

Richard C. Dubes 1 Dec. 1970 242 p refs

(Grant AF-AFOSR-1023-67)

(AD-720811; AFOSR-TR-71-0707; ISR-11) Avail: NTIS CSCL 6/4

Correlation functions have spawned a wide variety of data processing methods in a number of scientific disciplines. Under the broad umbrella of pattern recognition methodology, this report summarizes and coordinates several digital computer algorithms, all based on correlation matrices, for reducing the size of a data matrix and for producing algorithms which classify patterns. Each row of the data matrix represents a pattern and each column represents a feature. Correlation-based cluster-seeking algorithms which provide information used in choosing a decision-making strategy are also discussed. Author (GRA)

**N71-25847#** Michigan State Univ., East Lansing. Div. of Engineering Research.

**BAYESIAN DECISION MAKING AND LEARNING FOR CONTINUOUS-TIME MARKOV SYSTEMS**

Erdal Panayirci and Richard C. Dubes 16 Nov. 1970 144 p refs

(Grant AF-AFOSR-1023-67)

(AD-720810; AFOSR-TR-71-0711; ISR-9) Avail: NTIS CSCL 6/4

The document is concerned with Bayesian decision making and learning algorithms for a particular problem in parametric pattern recognition in which each of a finite set of pattern classes is characterized by a continuous-time, discrete-state Markov process. The basic problem considered is that of determining rules for making decisions about the identity of the active pattern class based upon observation of a sample function in some finite interval. The stationary transition probability matrices for the processes in question are the parameters of the pattern classes. Author (GRA)

**N71-25849#** RAND Corp., Santa Monica, Calif.

**AN EXPERIMENTAL INVESTIGATION OF THE EFFECT OF TARGET MOTION ON VISUAL DETECTION**

D. J. Dugas and H. E. Petersen Feb. 1971 45 p refs

(Contract F44620-67-C-0045)

(AD-720800; R-614-PR) Avail: NTIS CSCL 5/10

The document reports an experiment comparing the detection probabilities for moving targets against complex backgrounds; compares the results to the Bailey model for detection of static targets in random search (see RM-6158); and extends that model to cover moving targets by modifying Baileys glimpse-aperture factor to reflect the fact that a moving target is 2 to 8 times as easily found as a static one. For an aerial-photograph background, the improvement was about 4 times. In the experiment, seven subjects viewed a television display of an artificial, electronically generated target at two speeds against an aerial photo of wooded terrain, against felt, and against a grid. Results suggest--but do not prove--that it is not the motion itself that improves detection performance, but the contrast changes that occur as the target moves over a complex background. Author (GRA)

**N71-25850#** Michigan State Univ., East Lansing. Div. of Engineering Research.

**PATTERN RECOGNITION WITH CONTINUOUS PARAMETER, OBSERVABLE MARKOV CHAINS**

Richard C. Dubes and Erdal Panayirci 25 Nov. 1970 35 p refs  
(Grant AF-AFOSR-1023-67)  
(AD-720837; AFOSR-TR-71-0715; ISR-10) Avail: NTIS CSCL 6/4

The paper develops Bayesian learning and decision-making algorithms for the following pattern recognition problem. Each of M pattern classes is described by a continuous-parameter, discrete-state Markov chain having a finite number of states. All states and times of transition between states can be observed perfectly. The transition rate matrices, which establish the properties of the chains, are not known a priori. A Bayesian learning algorithm using a fixed amount of memory digests the training patterns which consist of a member function from each chain. This leads to an iterative, computationally simple, decision-making algorithm for classifying any portion of a member function. The Bhattacharya bound and the probability of error are derived for the 2-state, 2-chain problem when the transition rate matrices are known. The last section reports on a computer simulation of a 3-state, 2-chain problem with varying amounts of training data. An appendix summarizes the pertinent facts about Markov chains.  
Author (GRA)

**N71-25863#** Clark (David) Co., Inc., Worcester, Mass  
**DESIGN AND FABRICATION OF A PASSIVELY PRESSURIZED SUIT Final Report, Jul. 1968–Apr. 1970**  
Walter G. Pleskun and Joseph A. Ruseckas Jan. 1971 29 p refs  
(Contract F33657-68-C-1663)  
(AD-720827; AMRL-TR-70-120) Avail: NTIS CSCL 6/17

The purpose of the experimental effort was to evolve new designs and manufacturing technology applicable to high altitude pressure suits. Emphasis was placed on development of bladders using an elastomeric compound which would have excellent air retention for extended periods of time, would have the capability to expand sufficiently to serve as a redundant segment for failed adjacent bladders and would be economical to fabricate. Additional emphasis was placed on the development of a restraint coverall which would satisfy the requirements for passive ventilation, unpressurized maximum mobility, acceptable pressurized mobility, long term comfort unpressurized, adequate skin pressure during pressurization and lowest possible weight.  
Author (GRA)

**N71-25864#** Michigan State Univ., East Lansing. Div. of Engineering Research.  
**COMMAND AND CONTROL MODELS HAVING BIOPHYSICAL ANALOGS Final Report**  
William L. Kilmer and Richard C. Dubes 15 Feb. 1971 44 p refs  
(Grant AF-AFOSR-1023-67)  
(AD-720816; AFOSR-TR-71-0696) Avail: NTIS CSCL 6/4

Sections of the report present the work done by Dr. Kilmer on the computer modeling of the hippocampus, and that by Dr. Dubes on data studies, pattern recognition, and information compression. Final sections summarize the personnel and publications related to this work.  
Author (GRA)

**N71-25867#** Hawaii Univ., Honolulu. Dept. of Microbiology.  
**EFFECTS OF HYDROSTATIC PRESSURE ON PHOTOSYNTHESIS AND GROWTH OF UNICELLULAR MARINE ALGAE AND DIATOMS Annual Progress Report, 1 Apr. 1970–31 Mar. 1971**  
Leslie Ralph Berger 1 Apr. 1971 10 p refs  
(Contract N00014-67-A-0387-0008)  
(AD-720401; APR-2) Avail: NTIS CSCL 6/3

Light-dependent oxygen production and growth of algal cultures were measured at 25°C at various light intensities and hydrostatic pressures. A device which maintains a desired concentration of dissolved oxygen during growth and oxygen evolution by photosynthetic organisms is described. The system uses a modified rate-measuring oxygen electrode system in conjunction with an oxygen concentration monitoring unit.  
Author (GRA)

**N71-25871#** Michigan Univ., Ann Arbor.  
**GROUP EFFECTS ON INDIVIDUAL INFERENCE**  
Marcia Guttentag (City Univ. of N.Y.) and Gloria Wheeler [1970] 22 p refs Prepared in cooperation with City Univ. of N.Y.  
(Grant NSF GY-5611)  
Avail: Issuing Activity CSCL 05E

A Bayesian model is used to study group effects on individuals' subjective probability judgments. A probabilistic information task with a likelihood ratio response is utilized to establish whether the group effect will be not only to shift judgments in a riskier direction, but also whether this risky shift will be a shift in the direction of optimality. Experimental results show that cumulative odds groups are conservative while noncumulative likelihood ratio groups are veridical.  
G.G.

**N71-25925#** Ocean Systems, Inc., Tarrytown, N.Y. Research and Development Dept.  
**EFFECTS OF ENVIRONMENTAL PARAMETERS UPON COMBUSTION OF FIRE-RESISTANT MATERIALS, POTENTIAL ELECTRICAL SOURCES OF IGNITION AND ANALYSIS OF COMBUSTION PRODUCTS Summary Report, 1 Jan. 1970–31 Dec. 1970**  
Victor A. Dorr 1 Jan. 1971 54 p  
(Contract N00014-70-C-0169)  
(AD-720352; Rept-3) Avail: NTIS CSCL 6/11

Research during 1970 in the area of combustion safety in diving atmospheres has encompassed: Establishment of the relationship of gas composition, pressure and sample orientation on the rate of combustion of candidate materials for use in oxygen-enriched diving atmospheres; An evaluation of the correlation between small scale and large scale fir tests; An investigation of potential electrical sources of ignition in oxygen-enriched diving atmospheres; and Qualitative and quantitative analyses of the combustion products resulting from the burning of certain candidate materials.  
Author (GRA)

**N71-25937#** University of Southern Calif., Los Angeles. Dept. of Mathematics.  
**HIERARCHIES OF CONTROL PROCESSES AND THE EVOLUTION OF CONSCIOUSNESS**  
Richard Bellman Apr. 1971 6 p refs Presented at 6th Berkeley Symp. in Probability and Statistics, Berkeley, Calif., 9 Apr. 1971  
(Grant GM-16197-03)  
(TR-71-17) Avail: Issuing Activity

Some ideas in the mathematical theory of control processes are applied to biological phenomena such as instinct, learning, curiosity, adaptation and, finally, consciousness. The language and methodology of the theory of dynamic programming are employed. Detailed accounts of the mathematical ideas are presented.  
Author

**N71-25942#** General Electric Co., Philadelphia, Pa. Missile and Space Div.  
**STUDY OF APPLICATIONS OF BIO-SPACE TECHNOLOGY TO PATIENT MONITORING SYSTEMS Progress Report**  
Dec. 1970 304 p refs Conf. Held at Salt Lake City, 8–9 Dec. 1970  
(Contract NASw-2073)  
(NASA-CR-118645; PR-3) Avail: NTIS HC \$6.00/MF \$0.95 CSCL 06B

A patient monitoring system is defined with equipment specifications as formulated by a team of engineers and physicians, based on a survey of existing state-of-the-art systems followed by an evaluation of the systems. The capabilities of existing systems were improved by appropriate applications of aerospace technology. A systems engineering approach was used to define the system. The system is a modular one tailored to fulfill a variety of hospital requirements including the monitoring of cardiac, cardiovascular, pulmonary, and body chemistry (blood and urine) parameters. Minimum functional performance and test requirements are given.

The monitoring system consists of an integrated set of sensors and medical electronic units for monitoring selected physiological parameters of patients, displaying information at a remote station and/or bedside, initiating out-of-limit alarms and automatic monitor switching, and the devices required for physiological stimuli.

J.M.

**N71-25943\***# Man Factors, Inc., San Diego, Calif.

**DATABOOK FOR HUMAN FACTORS ENGINEERS.  
VOLUME 2: COMMON FORMULAS, METRICS,  
DEFINITIONS**

Charles Kubokawa, Wesley Woodson, and Peter Selby, eds. Nov. 1969 371 p refs  
(Contract NAS2-5298)

(NASA-CR-114272) Avail: NTIS CSCL 05E

Formulas, nomographs, metrics, conversion tables, symbols, definitions, and abbreviations and acronyms are presented that may be required at some time during the project activities of typical human engineering specialists.

Author

**N71-25944\***# Man Factors, Inc., San Diego, Calif.

**DATABOOK FOR HUMAN FACTORS ENGINEERS.  
VOLUME 1: HUMAN ENGINEERING DATA**

Charles Kubokawa, Wesley Woodson, and Peter Selby, eds. Nov. 1969 260 p  
(Contract NAS2-5298)

(NASA-CR-114271) Avail: NTIS CSCL 05E

Typical human engineering data useful in determining optimum design characteristics of equipment operated or maintained by human operators and/or maintenance personnel are presented. Anthropometry and equipment design are discussed as well as environmental conditions, and metabolic and behavioral factors.

Author

**N71-25953\***# Institute of Occupational Health, Helsinki (Finland). **ASSESSMENT OF REGIONAL HEAT LOSSES FOR VERIFICATION OF MATHEMATICAL ANALOGUES OF THE HUMAN THERMAL SYSTEM, PART 1** Final Scientific Report 1 Apr. 1966 – 30 Apr. 1970

Pekka Piironen and Kauko Takalo 30 Nov. 1970 75 p refs  
(Contract AF 61(052)-936)

(AD-720830; AFOSR-TR-71-0708) Avail: NTIS CSCL 6/16

Elaboration of mathematical analogues for the human thermal system implies that various simplified, steady-state and dynamic, heat transfer situations are experimentally mastered with full repeatability. In a stable thermal environment, the high thermal time constants of peripheral tissues and individual structural and functional differences impede the achievement of comparable and reproducible stationary and dynamic heat transfer situations in the organism at rest and during exercise. However, by active governing of the skin temperature, the establishment of steady states can be greatly accelerated and the development of desired dynamic states is under control. The aim of the study was to develop a set of equipment for regional controlling of skin temperatures and equipment for measuring the external heat exchange of the different parts of the body. The methods and equipment have been applied in testing a simple mathematical model which was worked out to describe the passive part of human heat transfer system.

Author (GRA)

**N71-25954\***# Ocean Systems, Inc., Tarrytown, N.Y. Research and Development Dept.

**COMPENDIUM OF HYPERBARIC FIRE SAFETY RESEARCH**  
**Final Report, 1 Apr. 1966 – 31 Dec. 1970**

Victor A. Dorr 28 Feb. 1971 34 p refs  
(Contracts N00014-66-C-0149; N00014-70-C-0169)

(AD-720353) Avail: NTIS CSCL 13/12

Four years of research in hyperbaric fire safety is summarized and reviewed in the compendium. The following areas of study are considered: Environmental parameters affecting combustion in

hyperbaric environments (ignition temperature and ignition delay, flame spread rates in helium and nitrogen diving atmospheres, Minimum oxygen concentration necessary for combustion in hyperbaric environments, correlation between small scale and large scale testing, the upper flammability limits of hydrogen-oxygen mixtures); Potential electrical source of ignition; High-expansion foam fire extinguishing tests; and Screening of flame resistant materials.

Author (GRA)

**N71-25957\***# School of Aerospace Medicine, Brooks AFB, Tex.

**EFFECTS OF MONOAMINE OXIDASE INHIBITORS AND RESERPINE ON BRAIN AMINES IN ALTITUDE EXPOSED RATS** Interim Report, Nov. 1969 – Jan. 1970

James H. Merritt and Miguel A. Medina Feb. 1971 11 p refs  
(AD-720808; SAM-TR-71-3) Avail: NTIS CSCL 6/19

Groups of rats were injected with either pargyline, Parnate, Catron, or reserpine (75 mg./kg., 5 mg./kg., 5 mg./kg., and 5 mg./kg. respectively) and taken to a simulated altitude of 18,500 ft. The expected rise in the brain monoamine (norepinephrine and serotonin) levels after administration of monoamine oxidase inhibitors and the decrease of norepinephrine by reserpine were attenuated by altitude exposure. In another experiment, 100 percent oxygen was substituted for ambient air. In this case, the attenuation of monoamine elevations by the inhibitors was reversed. However, the added oxygen did not reverse the attenuation of the norepinephrine decrease by reserpine.

Author (GRA)

**N71-25958\***# Philco-Ford Corp., Newport Beach, Calif. Aeronutronic Div.

**INVESTIGATION OF ANIMAL SENSOR AND SENSON INFORMATION PROCESSING MECHANISMS FOR APPLICATION TO TARGET ACQUISITION AND TRACKING** Final Report, 15 Jan. 1970 – 15 Jan. 1971

Robert E. Kay Feb. 1971 62 p refs

(Contract N00019-70-C-0150)

(AD-720412; U-4908) Avail: NTIS CSCL 6/2

The investigation was concerned primarily with the sensory modes used by flies, bees, and moths to acquire and track targets. Analyses of the findings suggested methodologies for the construction of a system to detect and possibly identify trace amounts of airborne chemicals and to a novel light sensing device which appears to have potential as an inexpensive solar cell. The olfactory instrument is composed of an array of units each one of which has its own view of the odor environment. The individual units may have a hair-like configuration and they can be electrically biased. Desorption of odor is readily accomplished by exposure to clean air. The effect of odor on the electrical bias is read from each individual unit in the array and the readout is fed to a logic system which constructs a final composite waveform to identify the odor constituent. A partially successful unit consisting of a filament coated with a liquid potassium soap and stretched between platinum electrodes is described, and the design for an organic semiconductor odor is suggested. The solar cell is composed of a sandwich constructed of a SnO<sub>2</sub> coated glass plate, a dye film made of Methyl Violet 2B agar and water, and a glass plate coated with bright platinum. A conversion efficiency for 500 nm light of 0.48 percent was demonstrated and it is indicated that the efficiency may be 5 percent or more. Electrical characteristics of the photocell are presented and the nature of the apparatus is discussed.

Author (GRA)

**N71-26019\***# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

**CONTROL ANALYSIS OF A REGENERATIVE CABIN ATMOSPHERE SYSTEM**

Robert D. Averill and Robert A. Smoak (Va. Univ.) Washington May 1971 87 p. refs  
(NASA-TN-D-6139; L-6674) Avail: NTIS CSCL 06K

**N71-26076**

The dynamic aspects of a typical atmosphere control system of the type suitable for earth-orbiting manned missions up to 1 year in length were studied. A dynamic, nonlinear model of the cabin atmosphere system was programmed on an electronic analog computer and sample cases were run at various conditions with both proportional and on-off system controllers. The study demonstrated that the cabin atmosphere control system model was basically stable with both types of controllers under normal operating conditions. Recovery of the system from assumed disturbances such as increased crew activity or cabin air-lock venting was marginal because of the limited capacity of the chosen components. Operation of the system with on-off controllers in an overloaded condition, representing an increase in the number of crew members during a resupply mode, resulted in a type of system instability with slight oscillations in cabin water vapor and carbon dioxide partial pressures. The results of the study indicate that transient system effects must be considered in future design studies of cabin atmosphere control systems for specific manned missions.

Author

**N71-26076#** Applied Psychological Services, Wayne, Pa. Science Center.

**DIGITAL SIMULATION OF THE PERFORMANCE OF INTERMEDIATE SIZE CREWS: APPLICATION AND VALIDATION OF A MODEL FOR CREW SIMULATION**

Arthur I. Siegel, J. Jay Wolf, and Joseph Cosentino Feb. 1971 157 p refs

(Contract N00014-68-C-0262)

(AD-720354; APS-7071-5) Avail: NTIS CSCL 5/8

Based on current psychological theory, military doctrine, and previously developed and tested functional relationships, selected psychosocial, personnel, and performance variables are woven into a stochastic mathematical model for digitally simulating closed man-machine systems operated by crews of from 4 to 20 members. This probabilistic model is presented in terms of a detailed logic and processing flow sequence. An operational mission (Viet Nam river patrol) selected for the evaluation of the model is then described and quantified as required for input to the model. The results of a series of evaluative simulation runs, in which the computer simulation model is applied to the mission, are reported. These results are compared with independent criterion data for the same mission.

Author (GRA)

**N71-26118#** Royal Aircraft Establishment, Farnborough (England) **SOME EXPERIMENTS TO DETERMINE ACCELERATION LIMITS FOR PASSENGER COMFORT, APPENDIX B**  
D. I. Paddison *In its Cabtrack Studies: Assessment of Autotaxi Urban Transport Systems* Jan. 1969 p 25-26 refs

Copyright. Avail: NTIS

The importance of the acceleration limits imposed by consideration of passenger comfort is outlined. Although there is much information on the limits of acceleration for survival, little attention seems to have been paid to comfort. The major factors affecting comfort in lateral and longitudinal maneuvers are: (1) the peak acceleration level, (2) the rate of change of acceleration, and (3) the degree of body support. (Seat design and whether safety belts are used.)

Author

**N71-26138#** Army Test and Evaluation Command, Aberdeen Proving Ground, Md.  
**SURVIVAL EQUIPMENT (AVIATION) Final Report**  
21 Jan. 1971 18 p  
(AD-720225; MTP-7-3-095) Avail: NTIS CSCL 6/7

The document identifies test methods and techniques necessary to determine the degree to which aviation survival equipment meets army requirements.

Author (GRA)

**N71-26158#** Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

**KINEMATIC ANALYSIS OF A SIX DEGREE OF FREEDOM****VIBRATION TABLE Final Report, 1 Sep. 1969-15 May 1970**

Darrell L. Wilburn and J. L. Kurzenberger Sep. 1970 41 p ref (AD-720269; AMRL-TR-70-87) Avail: NTIS CSCL 14/2

A mathematic formulation of the kinematic equations describing the motion of a six degree of freedom vibration table has been constructed for use in research on human subjects at the Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio. The background to the approach to the analysis is discussed and the derivation of the Kinematics equation is presented. A hybrid computer program is included that can be used to generate the solutions for the required lengths. The computer output can then be recorded on magnetic tape and used for analog inputs to the device.

Author (GRA)

**N71-26160#** Bolt, Beranek, and Newman, Inc., Cambridge, Mass.

**STUDIES OF MULTIVARIABLE MANUAL CONTROL SYSTEMS: A MODEL FOR TASK INTERFERENCE**

William H. Levison, Jerome I. Elkind, and Jane L. Ward Washington NASA May 1971 229 p refs (Contract NAS2-3080)

(NASA-CR-1746) Avail: NTIS CSCL 05E

The results of a study of multivariable manual control systems are presented. The objectives of this study were to investigate human performance in multivariable control and monitoring situations, to develop models for the controller in these situations, and to develop a metric for pilot workload. An extensive experimental study of multi-axis tracking performance is described. Data are presented for: (1) four-axis tracking tasks with visual scanning permitted among the four separate displays, (2) multi-axis tracking with fixation maintained on a single display, and (3) a complimentary set of single-axis tracking tasks with foveal and peripheral viewing of the display. Multi-axis behavior is shown to be consistent with single-axis results. A model is presented for interference among multiple control tasks. This model is based upon the assumption that multiple tasks are performed in parallel and that the human must share a fixed amount of central-processing capacity among the tasks. Validation is provided by a comparison of model predictions with experimental results obtained from multi-axis control situations and from a single-axis, multivariable control situation. A metric for pilot workload is suggested which is based upon the model for task interference.

Author

**N71-26167#** Army Medical Research and Nutrition Lab., Denver, Colo.

**SPECIES COMPARISON OF CARDIAC HYPERTROPHY IN ANIMALS CHRONICALLY EXPOSED TO HIGH ALTITUDE**

Thomas J. Bucci, Winfred D. Dean, George W. Bishop, Laszlo A. Frics, James A. Vogel et al Jan. 1971 38 p refs (AD-720596; USAMRNL-326) Avail: NTIS CSCL 6/19

Heart size and possible causative factors were compared in the dog, rat and rabbit after five months exposure to sea level, 5,380, 11,140 and 14,110 feet. From 5,380 to 14,110 feet, the ratio of right ventricle to body weight (RV/BW) increased in the rat by 50%, the rabbit by 59% and the dog by 6%. From sea level to 14,110 feet, the ratio of right ventricle to total ventricle (RV/T) increased progressively -- in the rat by 38%, the rabbit by 39% and the dog by 6%. At sea level the dog has a relatively larger right ventricle than either the rat or rabbit, with an RV/T ratio of .26 vs .21 and .22. Similarly, the dog has a RV/BW (g/kg) ratio of 1.66 vs .64 and .35, for the rat and rabbit respectively. Comparing sea level to 14,110 ft., packed cell volume (PCV) increased 16%, 30% and 36% respectively in the dog, rat and rabbit. Mean pulmonary artery pressure increased by 81% in the dog and 87% in the rabbit. These results suggest that hypoxic cardiac hypertrophy is not a simple function of increased PCV and pulmonary artery pressure since these latter changes occurred in all species while hypertrophy did not. The relative size of the heart and its possible reserve potential appear to be important factors. Electron microscopic examination of the myocardium showed

markedly enlarged, vesicular pale mitochondria in all three species. The mitochondrial cristae were reduced in number and irregularly arranged. Many of the capillaries had edematous endothelium. The significance of these ultrastructural changes is now known.

Author (GRA)

**N71-26168# RAND Corp., Santa Monica, Calif.  
INDUCED FIELDS AND HEATING WITHIN A CRANIAL  
STRUCTURE IRRADIATED BY AN ELECTROMAGNETIC  
PLANE WAVE**

A. R. Shapiro, F. R. Lutomirski, and H. T. Yura Nov. 1970 33 p refs

(AD-720589; P-4458-1) Avail: NTIS CSCL 6/18

The induced fields and the static heating patterns within a multi-layered spherical model that approximates the primate cranial structure irradiated by plane waves in the microwave spectrum are calculated. The relation of the model to the biological structure and the sensitivity of the results to the uncertainties in the dimensions and electrical properties of biological material are investigated. A method of solution for both the scattered and interior fields for a sphere with an arbitrary number of electrically different concentric layers is developed in a form readily amenable to machine computation. It is shown that the semi-infinite slab model is inappropriate for calculating the microwave radiation dosage to the human head and similar structures.

Author (GRA)

**N71-26172# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.**

**CREW EXPOSURE TO VIBRATION IN THE F-4C AIRCRAFT  
DURING LOW ALTITUDE, HIGH SPEED FLIGHT Final Report**

Jerry D. Speakman, Hubert F. Bonfili, Harold K. Hille, and John N. Cole Jan. 1971 473 p refs

(AD-720271; AMRL-TR-70-99) Avail: NTIS HC \$6.00/MF \$0.95 CSCL 6/19

Measurements were made of the total vibration environment that the crew member is exposed to in the aft compartment of a F-4C aircraft during low-altitude, high-speed flight. Data were obtained of the longitudinal, lateral and vertical linear accelerations and the roll, pitch and yaw angular accelerations in the aft compartment and of the lateral and vertical linear accelerations at the aircraft center of gravity. The flights were performed in the contour following mode at various speeds at an altitude of 100-1000 feet over several different types of terrain. Data analysis included peak counting, probability density and distribution, auto-power spectral density and tests for stationarity, randomness and normality. The individual degree-of-freedom results are presented in graphical and tabular form and in general indicate that the crew station vibration environment produced by the combination of gust response and maneuvering: (1) is stationary for up to 400 seconds; (2) does not satisfy the chi-square goodness-of-fit test for Gaussian distribution; (3) exhibits a spectral content that is determined by certain aircraft design characteristics; (4) has for various flight conditions a power spectral density that can vary in overall level by a factor of 30; (5) cannot be adequately simulated for human tolerance type studies by considering the vertical axis accelerations only.

Author (GRA)

**N71-26174# Conductron-Missouri, St. Charles.  
TRAINING POTENTIAL OF INFLIGHT AUDIO/VISUAL  
RECORDING EQUIPMENT FOR THE F-4E AIRCRAFT**

Robert L. Klamm, Delbert Jacobs (AFSC, Wright-Patterson AFB, Ohio), and Herbert J. Clark (Tactical Fighter Weapons Center, Nellis AFB, Nev.) Wright-Patterson AFB, Ohio Air Force Human Resources Lab. Dec. 1970 38 p ref (Contract F33615-69-C-1816)

(AD-720245; AFHRL-TR-70-25) Avail: NTIS CSCL 5/9

This report presents a detailed description of an Audio/Video Recording System developed to study the feasibility and training potential of in-flight video recordings through the gunsight and of

the instrument panel of an F-4E aircraft. The purpose of the study was to assess the value of the system as an aid in air-to-air and air-to-ground gunnery training. Flight tests were conducted in an F-4E aircraft at Nellis AFB, during which air-to-air and air-to-ground weapon delivery missions were recorded. Results of the tests proved the value of audio/video recording for training and mission evaluation, but indicated a requirement for a higher resolution video system. Additional advantages and limitations of the equipment and the tape recordings obtained are described, and it is recommended that additional tests be made with equipment capable of producing higher resolution video tapes.

Author (GRA)

**N71-26196# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.**

**HORIZONTAL STATIC FORCES EXERTED BY MEN  
STANDING IN COMMON WORKING POSITIONS ON  
SURFACES OF VARIOUS TRACTIONS, INCLUDING  
COEFFICIENTS OF FRICTION BETWEEN VARIOUS FLOOR  
AND SHOE MATERIALS**

K. H. E. Kroemer and Danny E. Roberson (Antioch Coll.) Jan. 1971 44 p refs

(AD-720252; AMRL-TR-70-114) Avail: NTIS CSCL 5/5

Experiments were conducted to measure maximal isometric horizontal push forces. Twenty-eight male subjects pushed forward with both hands, laterally with the preferred shoulder, and with their backs. Reaction force for body stabilization was provided by a vertical wall, a footrest, or by floor-shoe combinations with coefficients of static friction of approximately 1.0, 0.6, and 0.3. Means, standard deviations, and 5th percentiles of the exerted forces are reported. In comparing the experimental data with results previously published, it is concluded that body weight cannot serve as a reliable predictor for push force capability from floors of various tractions. Estimates for static horizontal push as well as pull force capabilities of one or several men are tabulated in relation to traction available to the operator. An appendix contains coefficients of static friction between nineteen floor materials and eight shoe materials.

Author (GRA)

**N71-26204# Miami Univ., Coral Gables, Fla. Center for  
Theoretical Studies.**

**DOES THE BRAIN HAVE SYMMETRY?**

Gerhard Mack Feb. 1971 51 p refs

(Grant NGL-10-007-010)

(NASA-CR-118517; CTS-B-71-2) Avail: NTIS CSCL 06P

A model designed to describe the first steps of information processing along the visual pathways of the brain is proposed. It was suggested that neurons carry out a harmonic analysis over the groups of symmetry transformations. It was shown that the brain can compute the compensating change of neuronal amplification factors for symmetry transformations induced by continuous rotation of the eyeball. The compensation is carried out by a control circuit. It was also shown how the brain can recognize exact and partial symmetries of patterns, and why diffuse illumination of the retina will lead to little or no response of most neurons, while sharp boundaries of light-dark will evoke enhanced activity. How information from different receptive fields should be added is also discussed.

E.H.W.

**N71-26245 Nebraska Univ., Lincoln.**

**A STUDY OF POLARIZATION AND ENERGY CONVERSION  
IN BIOLOGICAL FUEL CELLS**

James Lauris Hendrix (Ph.D. Thesis) 1969 123 p

Avail: Univ. Microfilms Order No. 70-12266

Yeast cultures, systems of lactate fermentations, and biological systems frequently found on a farm were studied. A fuel cell composed of platinum-blackened nickel screen electrodes and a cation exchange membrane as the electrolyte was used. Dilute ethanol and lactic acid solutions were used to study the parameters of the fuel cell. Fuel concentration, fuel flow rate, and the effect of the platinum-black catalyst were investigated. After interpretation of a

## N71-26261

number of the fuel cell parameters, six biological systems were studied and compared to each other and with the dilute ethanol and lactic acid systems. The biological systems studied were a *Saccharomyces carlsbergensis* fermentation, a contaminated *S. carlsbergensis* fermentation (acetic acid formed), *Lactobacillus delbrueckii* fermentations, sauerkraut juice, silage, and rumen liquor. It was found that of the systems studied, the lactic acid produced by *L. delbrueckii* was the best biological fuel. *Dissert. Abstr.*

### N71-26261# Santa Rita Technology, Inc., Santa Clara, Calif. EXPERIMENTS IN AUDITORY PERCEPTION WITH AN ANALOG MODEL FOR THE EAR Final Report, 10 Apr. 1968 10 Apr. 1970

John L. Stewart Wright-Patterson AFB, Ohio AMRL Oct. 1970 147 p refs  
(Contract F33615-68-C-1361)

(AD-720246; AMRL-TR-70-81) Avail: NTIS CSCL 6/16

The model representation for portions of peripheral, ascending and central mechanisms in auditory processing was extended so as to better match human behavior and structure. The improved model was needed to implement the fundamental purpose of the research, namely, developing better ways for achieving speech bandwidth compression. Of particular interest and importance were observations of the fluctuations in analog ear patterns at glottal rates. Earlier techniques with analog ears and spectrum analyzers which smooth over these fluctuations are rather misleading as to the significance of extracted measures. Various algorithms for realizing bandwidth compression in which voice pitch may or may not be retained are developed. The question of bandwidth compression is closely related to word recognition and other problems of practical significance. The presentation is sufficiently generalized to include these other possible applications. Author (GRA)

### N71-26293\* General Dynamics Corp., San Diego, Calif. Space Labs.

#### METHOD AND APPARATUS FOR ATTACHING PHYSIOLOGICAL MONITORING ELECTRODES Patent

John M. Keating, James A. Roman, Robert G. Green, and Charles W. Patten, inventors (to NASA) Issued 11 Feb. 1969 9 p Filed 10 Oct. 1966 Cl. 128-206; Int. Cl. A61b5/05; Int. Cl. B05b15/04 Sponsored by NASA  
(NASA-Case-XFR-07658-1; US-Patent-3,426,746;  
US-Patent-Appl-SN-586324) Avail: US Patent Office CSCL 06B

An adhesive spray process and instrumentation are described for fastening a biomedical electrode to the skin of a subject. This method permits biomedical monitoring of various physiological functions reflected in minute electrical potentials. G G

### N71-26295# Hamilton Standard, Windsor Locks, Conn. COMPUTERIZED ANALYTICAL TECHNIQUE FOR DESIGN AND ANALYSIS OF A SABATIER REACTOR SUBSYSTEM Final Engineering Report

R. A. Baum, Jr., F. L. Kester, and P. J. Lunde [1971] 365 p  
(Contract NAS9-9844)  
(NASA-CR-115026; SVHSER-5082) Avail: NTIS HC \$6.00/MF \$0.95 CSCL 06K

The Sabatier reaction is a vital step in the recovery of oxygen from carbon dioxide in many spacecraft life support systems. The kinetics of the Sabatier reaction are determined and a mathematical description of the reaction useful for steady state and transient conditions is used to solve such a model on a digital computer. The Sabatier kinetics were determined with sixty-eight tests using a small reactor filled with a commercial catalyst held at a constant temperature and pressure and fed with unreacted and partly reacted feed gases. Analysis was by gas chromatography. Activation energy found was 30,600 btu/lb-mol CO<sub>2</sub>. Limited comparisons of the mathematical computer model with test data were made. Agreements of + or - 20 F in temperature distribution and + or - 1% in conversion were achieved. Author

### N71-26302 Lovelace Foundation for Medical Education and Research, Albuquerque, N.Mex.

#### THE ACUTE EFFECTS OF AIR BLAST ON PULMONARY FUNCTION IN DOGS AND SHEEP Technical Progress Report Edward G. Damon, John T. Yelverton, Ulrich C. Luft, Kabby Mitchell, Jr., and Robert K. Jones Mar. 1970 43 p refs (Contract DA-49-146-XZ-372)

(AD-709972; DASA-2461) Avail: NTIS CSCL 6/21

The results of studies on the relationship between air blast injury and impairment of pulmonary function in dogs and sheep are presented. The impairment of pulmonary function was measured in terms of alterations in the venous-arterial shunt, ineffective alveolar ventilation, and blood-gas tensions. Author

### N71-26333\* Hamilton Standard, Windsor Locks, Conn. VENTING DEVICE FOR PRESSURIZED SPACE SUIT HELMET Patent

Alfred A. Gran and Ronald Lang, inventors (to NASA) Issued 21 Oct. 1969 5 p Filed 27 Feb. 1967 Cl. 2-6; Int. Cl. A42b3/00; Int. Cl. A62b18/04 Sponsored by NASA  
(NASA-Case-XMS-09652-1; US-Patent-3,473,165;  
US-Patent-Appl-SN-618969) Avail: US Patent Office CSCL 06Q

A venting device comprising a fixture mounted in the faceplate of a crewman's helmet for use with a pressurized space suit is described. The device incorporates valve means providing controlled venting of the helmet in the oral-nasal area. The device also has a collapsible duct or funnel positionable between a collapsed stowed condition adjacent the faceplate, and an operating position in which it projects into abutment with the mouth of the crewman. The device is used for the elimination of vomit expelled by the crewman. Official Gazette of the U.S. Patent Office

### N71-26366\*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

#### GENERAL MEASUREMENT PROBLEM AREAS

*In its Sixth Transducer Workshop 1969 p 65-119 refs*

Avail: NTIS CSCL 06B

Applications of standard transducers to the specialized area of bioengineering are presented. Off-the-shelf transducers are used in three research programs: (1) the evaluation of left ventricular work in man by the thermal dilution technique, essentially a temperature measuring problem; (2) the evaluation of the friction drag of biological fluids in contact with technological and biological surfaces, a drag or force measuring problem; and (3) the effects of high pressure (50 atmos) and dissolved gases on the viscosity of blood, and blood derivatives, a pressure measuring problem. Author

### N71-26371# Aeronautical Systems Div., Wright-Patterson AFB, Ohio.

#### COMBAT AIRCREW RESCUE SIMULATION Summary Report

Francis W. Smejkal Nov. 1970 73 p

(AD-720238; ASD/XR-70-20) Avail: NTIS CSCL 6/7

A description is given of a simulation model of combat aircrew rescue operations. This model is concerned only with the combat aircrew rescue mission. The engine-airframe contribution to rescue mission success is the factor being evaluated in the model. Effects of reliability, maintainability, and survivability are not considered. The report discusses the model structure and all underlying assumptions. Data required to operate the model are listed. In the appendices, a detailed and annotated program flow is given. Additionally, all equations used are derived and their use and application explained. Author (GRA)

### N71-26380\*# Biospherics, Inc., Rockville, Md.

#### AUTOMATED MICROBIAL METABOLISM LABORATORY Final Report

Donald G. Shaheen, Edward Rich, Jr., and William A. Lindgren 28 Apr. 1971 215 p refs

(Contract NASw-1931)

(NASA-CR-118659) Avail: NTIS CSCL 06M

Problems associated with life detection assays to be incorporated into an automated breadboard instrument are discussed.

Significant advances were made in the labeled carbon dioxide fixation-dark release and radioactive carbon and sulfur uptake experiments. In all cases, levels of the nonbiological signals were reduced and the overall precision of the experiments was increased by the incorporation of newly devised techniques into the assays. This greatly enhanced the sensitivity and reliability of these exobiology experiments. Measurement of the kinetics of biological responses as well as the study of experimental variables increased the store of knowledge and experience relative to each of the assays. The instrument components for the various experiments were designed, fabricated, integrated, and tested to demonstrate system feasibility. An integrated biology experiment was conducted using the instrument to perform the labeled release, labeled carbon and sulfur uptake, ATP production, and phosphate uptake experiments.

Author

**N71-26385\***# School of Aerospace Medicine, Brooks AFB, Tex. Environmental Sciences Div.

**FLUID BALANCE IN ARTIFICIAL ENVIRONMENTS. 2: INFLUENCE OF PHYSIOLOGICAL CHANGES UPON RATES OF SKIN INSENSIBLE WATER LOSS**

William M. Carleton and B. E. Welch Apr. 1971 46 p refs

(NASA Order T-74393-G)

(NASA-CR-115024) Avail: NTIS CSCL 06P

The significant and reproducible effects of ambient temperature ( $T_{\text{sub } a}$ ), water vapor pressure ( $P_{\text{sub } H_2O}$ ), total barometric pressure ( $P_{\text{sub } B}$ ), wind speed ( $V$ ), and atmospheric gas composition ( $G.C.$ ) upon the rate of water loss from human skin under various physiological and constant environmental conditions were investigated. With careful control of the physical parameters of the environment, i.e.,  $T_{\text{sub } a}$ ,  $P_{\text{sub } H_2O}$ ,  $P_{\text{sub } B}$ ,  $V$ , and  $G.C.$ , it was possible to vary the physiological state of the experimental subjects and document any significant changes in rates of skin insensible water loss that might be related to these physiological changes.

Author

**N71-26390\***# Lockheed Missiles and Space Co., Huntsville, Ala. Research and Engineering Center.

**EVALUATION OF ABSORPTION CYCLE FOR SPACE STATION ENVIRONMENTAL CONTROL SYSTEM APPLICATION Interim Report**

D. V. Hale, J. Thoenes, and C. K. Liu Mar. 1971 177 p refs

(Contract NAS8-25986)

(NASA-CR-103114; LMSC-HREC-D762909; HREC-5986-1) Avail: NTIS CSCL 06K

Fluids were selected on the basis of minimum system weight, minimum radiator area, low power consumption, and safety and operational requirements. Cycle, fluid, and component weight equations were compiled into a computer program for analyzing the refrigeration cycle. From the parametric analyses a test design condition was selected. Safety and stability requirements resulted in the selection of R-22 and dimethyl ether of tetraethylene glycol (DME-TEG) with a radiator temperature of 250 F. The program identified all design conditions including temperatures, flow rates, enthalpies, pressures and concentrations at every point in the cycle. Weights and areas were defined as well. The generator, separator, and recuperator components were designed, fabricated and installed with the absorber for closed loop testing of the total absorbent flow loop. The total system was scaled to 1/53 of the total 35 kW system. Detailed analyses used in determining the component designs are presented, as well as detailed test procedures and results. The general conclusion was that the zero-gravity absorption refrigeration system is feasible for use as an environmental control refrigerating system in space vehicles.

Author

**N71-26399\***# Connecticut Univ., Storrs. Dept. of Animal Diseases.

**BIOLOGICAL ACTIVITY OF LUNAR SOIL Final Report, 7 Jan.-31 Oct. 1970**

Alan J. Kenyon 1970 36 p refs

(Contract NAS9-8918)

(NASA-CR-118671) Avail: NTIS CSCL 06M

Clinical pathology procedures for the detection of diseases in germfree mice maintained within Class 3 isolators were developed and tested. Design and construction of an aerosolization chamber for the study of titanium-containing dusts has been completed. Standard curves have been obtained spectrophotometrically with  $TiO_2$ . Titanium has been detected in the lymphoid structures of hamsters, mice, and rats. In a prototype chamber, rats were treated with aerosolized  $TiO_2$  and distribution of titanium established.

Author

**N71-26410\***# Michigan Univ., Ann Arbor. Engineering Human Performance Lab.

**GRAPHICAL PREDICTIONS OF HUMAN STRENGTHS FOR TWO-HANDED IVA/EVA TASKS, PHASE 1**

Apr. 1971 176 p refs

(Contract NAS9-10973)

(NASA-CR-115014) Avail: NTIS CSCL 05E

Strength predictions are presented based on simulations performed with a computerized biomechanical model. Separate sections contain the following: (1) The development of the computerized model used in the simulations is described followed by a detailed presentation of the input data used for specific simulations. (2) Two-handed strength predictions are presented graphically for shirt sleeved activities as a function of hand positions, population size and strength, and gravity conditions. A summary of some general factors affecting strength capabilities is included. (3) Predictions are presented of two-handed force capabilities with an inflated A7L space suit and the PLSS and OPS backpacks. (4) A summary is given of the more general effects found from two-handed force predictions along with a discussion of the limitations and possible extensions of the results.

D.L.G.

**N1-26432** Texas Technological Univ., Lubbock.

**PERFORMANCE AND RECOVERY UNDER PROLONGED VIBRATION**

Tarek M. Khalil (Ph.D. Thesis) 1969 174 p

Avail: Univ. Microfilms Order No. 70-12312

The performance and recovery characteristics of men when subjected to relatively long periods of whole body, vertical vibration is investigated. Seven male subjects participated in the experiment. They were to perform according to four work/rest schedules, under normal and vibratory environments, with performance measured during nine periods throughout the experiment. The task adopted for this investigation was one of vertical compensatory tracking. The controlled element, seen as a beam of light on a cathode ray tube, was driven upward and downward by a program prerecorded on a magnetic tape. The subjects' task was to keep the controlled element aligned with a horizontal line displayed in the center of the CRT, by use of a hand controller. This task was performed under normal environment as well as relatively long period vibrational environments. The vibrational environment of interest was that of a vertical sinusoidal vibration with a frequency of 5 cps and an amplitude of 0.08 inches.

Dissert. Abstr.

**N71-26456\***# Joint Publications Research Service, Washington, D.C.

**THE SOIL SCIENCES AND THE PRODUCTIVITY OF THE BIOSPHERE**

V. A. Kovda *In its Vestn. of the USSR Acad. of Sci.*, Vol. 40, No. 6, 1970 31 Aug. 1970 p 103-112 ref

Avail: NTIS

The history of the development of soil science is projected. It is stipulated that photosynthesis on dry land is the main source

**N71-26566**

of energy drawn into soil formation, and that the driving force of that process is the combination of biological and geological circulation of substances which brought the formation of different types of soils and landscapes. The accumulation of a stable complex of organic substances with its enormous sources of latent energy is a general planetary function of the soil cover in the biosphere. Grassy landscapes store energy in their humus shells exceeding by 20 to 30 times the energy in the plant biological mass. G.G.

**N71-26566#** Forsvarets Forskningsanstalt, Stockholm (Sweden).  
Avdelning 1.

**EXPERIENCES IN THE FIELD OF CLEANLINESS  
TECHNIQUE IN SWEDEN [ERFAHRUNGEN AUF DEM  
GEBIET DER REINHEITSKONTROLLE IN SCHWEDEN]**

Bertil Wedin Sep. 1969 11 p In SWEDISH Presented at Dechema Jahrestagung, Frankfurt, 27 Jun. 1969  
(FOA-1-C-1325-76) Avail: NTIS

Intensified cleanliness control has led to considerable economic benefits for the Swedish airforce and the State Bacteriological Laboratory. The percentage error in manufactured ball bearings and polio and immunizing vaccines has fallen to a very large extent or has been wholly eliminated. Another progressive stage in the control of cleanliness stems from the production and use of aerosol filter material based on glass fibers, the construction of instruments for the analyses of airborne organic compounds and progress in collection methods for microorganisms and identification of microorganisms by means of fluorescing antibodies. Author

**N71-26597#** Forsvarets Forskningsanstalt, Stockholm (Sweden).  
Avdelning 2.

**REPORT ON A CONFERENCE ON PICTURE PROCESSING  
[RAPPORT FRAN KONFERENS OM BILDBEHANDLING]**

Torleiv Orhaug Nov. 1969 7 p In SWEDISH Conf. held at Munich, 18-22 Aug. 1969  
(FOA-2-C-2354-72) Avail: NTIS

Image evaluation studies comprise: (1) real-time interpretation, image intensifiers and television systems; (2) systems approach to image interpretation and sensor design; (3) image parameters; (4) search and detection; (5) the human visual system; (6) problems arising in the use of optical instruments; and (7) theoretical studies, simulation and pattern recognition. G.G.

**N71-26622#** Joint Publications Research Service, Washington, D.C.

**SOME ASPECTS OF THE NUTRITION OF AQUANAUTS IN  
UNDERWATER LABORATORIES AND IN WATER**

Yu. M. Barats et al 18 May 1971 7 p refs Transl into ENGLISH from Vopr. Pitaniya (Moscow), no. 2, 1971 p 17-22  
(JPRS-53161) Avail: NTIS

The results of observations on the experimental nutrition of aquanauts in an underwater station of the open type and in weightlessness are presented. Based on an analysis of the observations and the literature data, the dietary requirements of aquanauts are discussed. The possibility of satisfying these requirements are examined. Author

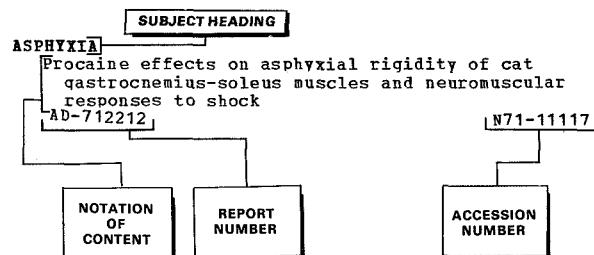
**N71-26638#** Defense Documentation Center, Alexandria, Va.  
**FUNGUSPROOFING: INDUSTRIAL PROCESSING SERIES,  
VOLUME 1 Report Bibliography, Dec. 1943-Jul. 1970**  
Feb. 1971 73 p refs  
(AD-720202; DDC-TAS-70-83-1) Avail: NTIS CSCL 6/6

The bibliograph is the first volume of a two-volume set on Fungusproofing in a series of bibliographies on Industrial Processing. It includes 44 annotated references and covers the period from January 1953 to January 1971. Corporate author-monitoring agency, subject, title, personal author, and report number indexes are included. GRA

# Subject Index

AEROSPACE MEDICINE AND BIOLOGY / A Continuing Bibliography (Suppl. 92) AUGUST 1971

## Typical Subject Index Listing



The Notation of Content (NOC), rather than the title of the document, is used to provide a more exact description of the subject matter. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

## A

### ABDOMEN

Abdominal pressure decrease resulting in transpulmonary pressure cranio-caudal gradient increase under gravitational effect simulation  
A71-28437

### ABIOTROPHISM

Hydrocarbons as foundation for life development universe, discussing chemical composition of galaxy, antimatter existence, interstellar medium and cosmic age factors  
A71-28678

Extraterrestrial and earth life genesis, discussing carbon foundation, planetary conditions, water prerequisite and space exploration  
A71-28679

Chemical evolution and extraterrestrial life detection, noting cell proliferation methods, automatic biological stations and Mars microorganisms  
A71-28680

Hydrocarbons, amino acids and large molecule organic compounds formation in chondrite meteorites by abiogenetic reactions  
A71-28692

### ABSORBERS (MATERIALS)

Zero-gravity absorption refrigeration system design and performance testing for space station environmental control application  
[NASA-CR-103114]  
N71-26390

### ACCELERATION (PHYSICS)

Investigation of visual perception ability during acceleration and deceleration and thresholds for perceived motion changes  
N71-24727

Physiological effects of positive acceleration on cardiovascular system based on requirements for cardiovascular simulation  
[AD-719902]  
N71-25674

Determination of acceleration limits for passenger comfort in urban transportation system  
N71-26118

### ACCELERATION STRESSES (PHYSIOLOGY)

Somatic and autonomic responses in vestibular tolerance of human subjects, using Coriolis acceleration test  
A71-28414

Vertical translational acceleration perception threshold of aircraft pilot seated in upright position  
A71-29780

### ACCELERATION TOLERANCE

Accelerations effect on receptors in semicircular canals during human movements in rotating environment, using vector analysis  
A71-28415

### ACCLIMATIZATION

Heat acclimatization effects on sweat Na concentration over wide sweat rates range, discussing possible mechanisms  
A71-29498

Annotated bibliography on human acclimation and acclimatization to heat  
[NASA-TM-X-620081]  
N71-25393

### ACETATES

Hypothermia effect on lipid synthesis of hamster tissue following intravenous injection of acetate-C 14  
A71-29582

### ACETYL COMPOUNDS

Acetyl-coenzyme A synthetase in aerobic yeast cells localization in microsomal fraction by density gradients  
A71-31003

### ACID BASE EQUILIBRIUM

Respiratory acid-base disturbances, studying deviations of bicarbonate ion vs pH pathway followed by buffered solution on carbon dioxide titration  
A71-28434

### ACOUSTIC ATTENUATION

Earmuff hearing protectors evaluation for attenuation of narrow band noise on experienced subjects  
A71-30196

### ACOUSTIC MEASUREMENTS

Noise exposure index from mean sound intensity measurement, considering harmful effects on humans  
A71-29284

Numerical analysis of loudness, loudness level, and sound-pressure level of pure tones of steady noise that does not exceed critical bandwidth  
[NASA-TM-X-2298]  
N71-25789

### ACOUSTIC PROPERTIES

Numerical analysis of loudness, loudness level, and sound-pressure level of pure tones of steady noise that does not exceed critical bandwidth  
[NASA-TM-X-2298]  
N71-25789

### ACTIVATION (BIOLOGY)

Stearothermophilus spore germination stimulation, investigating effects of preheating and amino acid and carbohydrate concentration  
A71-28695

### ACTIVITY (BIOLOGY)

Marmot ketone bodies concentration during activity, deep hibernation and early arousal, discussing increased oxidative metabolism effects  
A71-29125

Superposition model of spontaneous activity of cerebellar Purkinje cells for spike triggering  
A71-29289

### ACTIVITY CYCLES (BIOLOGY)

Alpha rhythm activity, periodicity and mean frequency in cortex regions of healthy humans based on EEG frequency and correlation analyses  
A71-30551

### ADAPTATION

Intense muscular work adaptation in rats, reducing biochemical and adaptive changes and enhancing anabolic processes  
A71-30552

### ADAPTIVE CONTROL

Application of dynamic programming and theory of control processes to biological phenomena

including evolution of consciousness [TR-71-17]	N71-25937
<b>ADENOSINE TRIPHOSPHATE (ATP)</b>	
Luciferin fermentative oxidation method for adenosine triphosphate determination in extraterrestrial life detection, using extract of firefly luminescent organs	A71-28683
Automated procedure for direct cell count of bacteria in urine by bioluminescence reaction of luciferase when mixed with ATP [NASA-TM-X-65521]	N71-25035
<b>ADENOSINES</b>	
Coronary blood flow response to acute and chronic hypoxia, observing vascular smooth muscle relaxation relation to released adenosine	A71-30281
<b>ADHESIVE BONDING</b>	
Adhesive spray process for attaching biomedical skin electrodes [NASA-CASE-XFR-07658-1]	N71-26293
<b>ADRENAL GLAND</b>	
Adrenocortical function in garden dormouse during autumnal preparation for hibernation, considering environmental temperature factors	A71-29315
<b>ADRENAL METABOLISM</b>	
Adrenal medulla biochemistry and morphology, discussing epinephrine synthesis control by glucocorticoid hormones	A71-30809
<b>AERIAL EXPLOSIONS</b>	
Relationship between air blast injury and impairment of pulmonary function in dogs and sheep [AD-709972]	N71-26302
<b>AERIAL RECONNAISSANCE</b>	
Visual detection probability for moving target against static target [AD-720800]	N71-25849
<b>AEROBIOLOGY</b>	
Acetyl-coenzyme A synthetase in aerobic yeast cells localization in microsomal fraction by density gradients	A71-31003
<b>AEROSPACE ENVIRONMENTS</b>	
Soviet papers on extraterrestrial life and detection methods covering biological conditions, extremal environmental factors and spacecraft sterilization	A71-28677
Toxicological evaluation of CO in humans and other mammals, considering pilot performance prediction for aircraft environment	A71-28902
<b>AEROSPACE MEDICINE</b>	
Functions of medical services charged with ensuring flying personnel fitness, stressing aging process	A71-28487
Functional diagnostics in aerospace medicine for evaluating pilot ability and flight stresses	A71-28488
Aerospace medicine - Conference, Houston, April 1971	A71-29300
Possibilities of alcohol detection in blood and other tissue by alcohol examinations using experience from aircraft accidents case histories	A71-29366
Roentgenological analysis of paranasal sinuses in civil aviators, studying facial cavities infection	A71-29367
Soviet book on aviation medicine covering human anatomy and physiology, atmospheric physics, flight effects, respiratory systems, crew diets, etc	A71-29943
Annotated bibliography of translations of foreign language articles on aviation medicine, vestibular function, body temperature, and physiological effects [FAA-AM-71-5]	N71-24745
Annotated bibliography and indexes on Aerospace Medicine and Biology - March 1971 [NASA-SP-7011/87/]	N71-25745
<b>AFFERENT NERVOUS SYSTEMS</b>	
Joint action of various afferents in regulation of human posture, considering appropriate differential reactions	A71-27833
Human odorant evoked response, considering stimulation of olfactory receptors and trigeminal afferences in nose	A71-28891
<b>AFTERIMAGES</b>	
Human afterimage and pupillary activity in darkness after strong light exposure, noting dependence on stimulus intensity and duration	A71-28463
Human visual geometrical illusions and figural aftereffects, determining mechanism locations for spatial patterns physical and phenomenal properties	A71-28464
<b>AGE FACTOR</b>	
Ventricular septal defect, discussing incidence, human physiological responses, morbidity and mortality in various age groups	A71-27862
Near and intermediate vision in civil aircraft crews, presenting statistical evaluation of age factor effect on visual acuity in professional and nonprofessional personnel	A71-28507
Airline flight personnel fitness downgrading, presenting statistical breakdown by age and physiological or psychological causes	A71-28509
<b>AGING (BIOLOGY)</b>	
Functions of medical services charged with ensuring flying personnel fitness, stressing aging process	A71-28487
<b>AIR</b>	
Air ionization and effects of positive ions in air on man using Am-241 sources [ORNL-TR-2427]	N71-25438
<b>AIR FLOW</b>	
Respiratory air flow optimal regulation hypothesis, testing analytic prediction model results with experiment under stress and rest conditions	A71-29491
<b>AIR POLLUTION</b>	
Air pollution study of jet aircraft emissions in airport vicinity, involving exhaust gas testing, ground operations and passenger cabin measurements [SAE PAPER 710429].	A71-28315
<b>AIR TRAFFIC CONTROL</b>	
Physiological and biochemical measurements of air traffic controller personnel at O'Hare Airport to determine effects of duties [FAA-AM-71-2]	N71-24747
<b>AIRCRAFT ACCIDENT INVESTIGATION</b>	
Possibilities of alcohol detection in blood and other tissue by alcohol examinations using experience from aircraft accidents case histories	A71-29366
<b>AIRCRAFT ACCIDENTS</b>	
Aircraft accident rescue system with helicopters, discussing cooperation between helicopter service and ground personnel	A71-28721
<b>AIRCRAFT CONTROL</b>	
V/STOL and supersonic commercial aircraft developments, comparing man and machine performance as information processing systems for aircraft control and navigation	A71-28486
Head- or helmet-mounted display/control system in V/STOL aircraft for pilot workload and training reduction [AHS PREPRINT 532]	A71-31093
Linear transfer function for describing human response to aircraft control	N71-24710
<b>AIRCRAFT EQUIPMENT</b>	
Aircraft survival equipment testing including maintainability, systems compatibility, human factors engineering, and reliability of rations, protective clothing, floats, and parachutes [AD-720225]	N71-26138

<b>AIRCRAFT INSTRUMENTS</b>		
Aircraft personnel radiation hazards from radioactive luminous paint on instrument dials, signs and operational elements		
	A71-29145	
<b>AIRCRAFT MAINTENANCE</b>		
Cleanliness control effects on aircraft components and immunization vaccine productions in Sweden [FOA-1-C-1325-76]	N71-26566	
<b>AIRCRAFT NOISE</b>		
Weighting method for aircraft auditory risk limits when wearing ear protectors [AD-719861]	N71-25086	
<b>AIRCRAFT PILOTS</b>		
Jet pilots training technologies, discussing multimedia instruction, psychological stress reduction, self study, airborne video application and simulation [SAE PAPER 710477]	A71-28342	
Airline pilot training specific behavioral objective concept, noting introduction with Boeing 744 [SAE PAPER 710479]	A71-28344	
Personnel training in airline operations technology at Friedrich List Transportation Institute for aircraft pilots, flight safety engineers and systems engineers	A71-29143	
Vertical translational acceleration perception threshold of aircraft pilot seated in upright position	A71-29780	
<b>AIRCRAFT STABILITY</b>		
Tracking error frequency response function and human psychomotor performance under aircraft vertical and lateral vibration conditions [AD-719754]	N71-25087	
<b>AIRFRAMES</b>		
Engine-airframe contribution to combat aircrew rescue simulation [AD-720238]	N71-26371	
<b>AIRLINE OPERATIONS</b>		
Airline flight personnel fitness downgrading, presenting statistical breakdown by age and physiological or psychological causes	A71-28509	
Personnel training in airline operations technology at Friedrich List Transportation Institute for aircraft pilots, flight safety engineers and systems engineers	A71-29143	
<b>AIRPORT TOWERS</b>		
Physiological and biochemical measurements of air traffic controller personnel at O'Hare Airport to determine effects of duties [FAA-AM-71-2]	N71-24747	
<b>ALCOHOLS</b>		
Possibilities of alcohol detection in blood and other tissue by alcohol examinations using experience from aircraft accidents case histories	A71-29366	
<b>ALGAE</b>		
Regeneration of spacecraft cabin atmospheres utilizing photosynthesis of unicellular algae [AD-719831]	N71-25099	
Hydrostatic pressure effects on photosynthesis, growth, and oxygen production of algal cultures [AD-720401]	N71-25867	
<b>ALGORITHMS</b>		
Quantitative performance evaluation of man machine systems in stochastic environments, deriving simulation algorithm	A71-29286	
Algorithms of self organization, artificial intelligence, and tree search applied to various practical problems [AD-719930]	N71-25652	
<b>ALTITUDE ACCLIMATIZATION</b>		
Oxygen dissociation curve shift, hemoglobin affinity and diphosphoglycerate concentration in blood of acidotic and normal subjects at altitude	A71-29494	
High altitude pulmonary edema in unacclimatized humans, discussing symptoms, etiology incidence and prevention	A71-30277	
<b>ANGULAR ACCELERATION</b>		
High altitude acclimatized humans, noting decreased coronary blood flow and increased oxygen extraction	A71-30283	
High altitude residents cardiovascular evaluations, showing right ventricular enlargement and reactive pulmonary hypertension	A71-30285	
Chronic hypoxia effects on blood oxygen and carbon dioxide tensions and pH changes in unanesthetized chickens at high altitude compared to sea level control	A71-30565	
<b>ALTITUDE TESTS</b>		
Body fat influence with and without denitrogenation on decompression sickness in men exercising after abrupt exposure to altitude	A71-29361	
<b>ALVEOLAR AIR</b>		
Alveolar and arterial carbon dioxide partial pressure during rebreathing experiments at rest	A71-28435	
Pulmonary oxygen toxicity development rate and effects on lung volume and alveolar-arterial gas exchange during oxygen breathing	A71-29501	
High altitude pulmonary edema syndrome, investigating increased alveolar-arterial oxygen gradients of humans during treadmill exercise	A71-30279	
<b>ALVEOLI</b>		
Lung diffusing capacity for oxygen during exercise and alveolar hypoxia measured without blood samples by ear oximeter	A71-29492	
<b>AMBIENT TEMPERATURE</b>		
Heat balance of human body submerged in water, determining body temperature reduction as function of ambient temperature	A71-28508	
<b>AMERICIUM 241</b>		
Air ionization and effects of positive ions in air on man using Am-241 sources [ORNL-TR-2427]	N71-25438	
<b>AMINES</b>		
Monoamine oxidase inhibitors and norepinephrine decrease by reserpine affecting brain amines in altitude exposed rats [AD-720808]	N71-25957	
<b>AMINO ACIDS</b>		
Dietary pyridoxal deficiency causing amino acid content reduction in liver, kidney, brain and heart tissues	A71-27837	
Hydrocarbons, amino acids and large molecule organic compounds formation in chondrite meteorites by abiogenetic reactions	A71-28692	
Quantitative analysis of gamma aminobutyric acid in brain after locomotion and pure oxygen breathing [DLR-FB-71-03]	N71-24456	
<b>AMPLIFIERS</b>		
Electrocardiography from unprepared skin without paste, using integrated stainless steel electrode- buffer amplifiers	A71-29399	
<b>ANALOG SIMULATION</b>		
Analog simulation of cardiac malfunctions associated with A-V conduction block and Wenckebach phenomenon, using P and R wave and internal function generators	A71-29001	
Analog simulation of peripheral, ascending, and central auditory perception mechanisms and bandwidth compression relationships to speech recognition [AD-720246]	N71-26261	
<b>ANALYZING</b>		
Automated microbial metabolism life detection experiments for exobiological studies [NASA-CR-118659]	N71-26380	
<b>ANATOMY</b>		
Papers on anatomy and mechanisms of mammalian sensory systems including vision, audition and touch	A71-30251	
<b>ANGULAR ACCELERATION</b>		
Rotation perception in dark and oculogyral		

## ANGULAR VELOCITY

## SUBJECT INDEX

illusion, using power law to describe subjective vestibular sensation relation to angular acceleration stimulus pulses	A71-29327	artificial gravity space station [NASA-CR-114982] N71-24454
<b>ANGULAR VELOCITY</b> Mathematical model for short term adaptation to vestibular stimuli, deriving transfer function relating angular velocities of nystagmus and head rotation	A71-30250	ARTIFICIAL INTELLIGENCE Algorithms of self organization, artificial intelligence, and tree search applied to various practical problems [AD-719930] N71-25652
<b>ANNOTATIONS</b> Annotated bibliography on human acclimation and acclimatization to heat [NASA-TM-X-62008] N71-25393		ASSAYING Automated procedure for direct cell count of bacteria in urine by bioluminescence reaction of luciferase when mixed with ATP [NASA-TM-X-65521] N71-25035
<b>ANOXIA</b> Anoxia induced ECG lesion current in conjunction with myocardial phosphorylcreatine collapse, discussing results with air and nitrogen ventilated quinea pigs	A71-28506	ASTRONAUT PERFORMANCE Graphical predictions of human strengths for two handed IVA/EVA tasks including effects of differing gravities, populations, and space suit conditions [NASA-CR-115014] N71-26410
Simple organisms resistance and adaptation to low pressure, anoxia, intense cooling, UV irradiation and Mars conditions	A71-28687	ASTRONAUT TRAINING Human body attitude control in space, using ten body complex geometry system, noting astronaut training jig A71-29832
<b>ANTHROPOMETRY</b> Human factors engineering data for equipment design including anthropometry, environmental conditions, and physiological and behavioral factors [NASA-CR-114271] N71-25944		Man and equipment instrumentation in simulated space environment, considering training and interface of man and life support systems A71-30312
<b>ANTICOAGULANTS</b> Blood liquid state control in sanguiferous canal as function of humoral feedback in coagulation, fibrinolytic and anticoagulation systems	A71-28718	Design and tests of astronauts tool kit and tools for in-flight space maintenance [NASA-CR-103135] N71-25533
<b>ANXIETY</b> Set and uncertainty as factors influencing anticipatory cardiovascular response in humans, monitoring heart rate and vasomotor activity	A71-28809	<b>ASTRONAUTS</b> Astronaut protection from solar flare high energy protons, discussing spacesuit, spacecraft orientation and solid, electrostatic, magnetic and plasma shielding A71-29252
<b>AORTA</b> Ultrasonic echocardiograms of anterior cusp of mitral valve in aortic valve disease	A71-27814	<b>ATMOSPHERIC COMPOSITION</b> Effects of atmospheric gas and moisture concentration, temperature, pressure, and wind velocity on human performance and skin water loss rate [NASA-CR-115024] N71-26385
Vessels mechanical behavior and blood flow dynamics in aorta bifurcation zone, using Navier- Stokes and continuity equations	A71-28657	<b>ATMOSPHERIC TURBULENCE</b> Atmospheric turbulence induced aircraft vibrations effects on aircrew performance, discussing physiological and psychological responses A71-29778
Sudden death and syncope mechanism in aortic valve stenosis, noting presence of baroceptors in left ventricular wall	A71-29301	Large subsonic jet aircraft civil pilots performance under physiological and psychological stresses induced during severe atmospheric turbulence A71-29783
<b>APPLICATIONS OF MATHEMATICS</b> Mathematic formulation of kinematic equations to describe motion of six degrees of freedom vibration table for use in research on human subjects [AD-720269] N71-26158		<b>ATTACKING (ASSAULTING)</b> Fighting between male mice isolated at early age or reared in small groups, considering ontogenetic and experiential determinants A71-28805
<b>ARGON</b> Ar, N and Ne partial pressure tolerance in dogs, plotting saturation curves	A71-28038	<b>ATTITUDE CONTROL</b> Human body attitude control in space, using ten body complex geometry system, noting astronaut training jig A71-29832
<b>AROUSAL</b> Marmot ketone bodies concentration during activity, deep hibernation and early arousal, discussing increased oxidative metabolism effects	A71-29125	<b>AUDIOMETRY</b> Quick-check audiometry reliability for testing hearing ability according to fitness regulations, comparing to complete tone and speech audiometry A71-29821
<b>ARRHYTHMIA</b> Development of system for identifying dynamic heart rate response to respiration [AD-719860] N71-24953		<b>AUDITORY PERCEPTION</b> Intramodal and crossmodal sensory transfer of visual and auditory temporal patterns in normal young adults A71-29326
<b>ARTERIES</b> Hypertension and heart or arterial disease relationships, discussing cause and effect mechanisms in coronary diseases	A71-27866	Acoustic nerve, cochlear nucleus and superior olivary complex central projection, investigating ascending auditory system organization A71-30255
Alveolar and arterial carbon dioxide partial pressure during rebreathing experiments at rest	A71-28435	Weighting method for aircraft auditory risk limits when wearing ear protectors [AD-719861] N71-25086
High altitude pulmonary edema syndrome, investigating increased alveolar-arterial oxygen gradients of humans during treadmill exercise	A71-30279	Analog simulation of peripheral, ascending, and central auditory perception mechanisms and bandwidth compression relationships to speech recognition [AD-720246] N71-26261
Systemic arterial blood pressure response to chronic high altitude and hypoxia effects	A71-30280	<b>AUDITORY STIMULI</b> Behavioral arousal and EEG thresholds changes during sleep due to electrical and audio
<b>ARTIFICIAL GRAVITY</b> Physiological effects and design criteria for		

<b>stimulation</b>	A71-28379	continuous-time Markov process [AD-720810] N71-25847
Humans and animals vestibular stimuli effect on external respiration function and respiration center neuron activity	A71-28413	Bayesian algorithms for Markov chain pattern recognition problems [AD-720837] N71-25850
Habituation and dishabituation of human vertex response, using auditory or somatosensory stimuli	A71-28890	Bayesian model for group effects on individual decision making N71-25871
Repetitive stimulation effects on auditory evoked potentials in cochlear nucleus, inferior colliculus and medial geniculate body of unanesthetized cats	A71-28892	BED REST Psychobiological effects of prolonged bed rest in young healthy volunteers from EEG recording, psychological testing and psychomotor performance A71-29363
<b>AUTOMATIC FLIGHT CONTROL</b>		
Component connection schemes of brain for trainable feedback flight control system	N71-25326	BEHAVIOR Behavioral arousal and EEG thresholds changes during sleep due to electrical and audio stimulation A71-28379
<b>AUTOMATION</b>		
Automation in cardiology, discussing analog and digital computer techniques for on-line hemodynamic analysis and collection and manipulation of cardiovascular data	A71-27868	BENDING VIBRATION Bending and torsional oscillations in rectangular specimens of femur and tibia, calculating elastic and shear moduli of compact bone tissues A71-28658
<b>AUTONOMIC NERVOUS SYSTEM</b>		
Somatic and autonomic responses in vestibular tolerance of human subjects, using Coriolis acceleration test	A71-28414	BIBLIOGRAPHIES Multicategory bibliographic classification of human behavior computer simulation models A71-30461
Human hypoxic ventilatory drive data for high altitude breathing, noting motivation reduction inversely related to time and altitude	A71-30288	Annotated bibliography of translations of foreign language articles on aviation medicine, vestibular function, body temperature, and physiological effects [FAA-AM-71-5] N71-24745
Ventilatory control in acute hypoxia, detailing polycythemia effects on respiratory chemoreceptor sensitivity	A71-30289	Annotated bibliography on human acclimation and acclimatization to heat [NASA-TM-X-62008] N71-25393
<b>AUTOTROPHS</b>		Annotated bibliography and indexes on Aerospace Medicine and Biology - March 1971 [NASA-SP-7011/87] N71-25745
Autotrophic cultivation of cereals with high photosynthetic activity under intensive illumination as biological components in life support systems	A71-28405	Corrosion prevention by fungus-proofing - bibliography [AD-720202] N71-26638
<b>AVIONICS</b>		
Human factor considerations applicable to aviation armament and avionics [AD-719108]	N71-24453	<b>BINAURAL HEARING</b> Earmuff hearing protectors evaluation for attenuation of narrow band noise on experienced subjects A71-30196
<b>B</b>		
<b>BACILLUS</b>		
Survey and critique of bacterial growth quantitative determination methods including Bacillus coli direct microscopic morphology and growth measurement [NASA-TT-F-13652]	N71-24584	<b>BIOASSAY</b> Lipid, protein and carbohydrate concentrations in Chlorella biomass from pyrolysis and aluminogel column chromatography A71-28407
Polarization and energy conversion efficiency of yeast and Bacillus lactate fermentation for biochemical fuel cells	N71-26245	<b>BIOCHEMICAL FUEL CELLS</b> Polarization and energy conversion efficiency of yeast and Bacillus lactate fermentation for biochemical fuel cells N71-26245
<b>BACTERIA</b>		
Hypoxia effects on organism resistance and immunobiological reactivity, noting bacterial and protozoa infections aggravation	A71-28401	<b>BIOCHEMISTRY</b> Functional-biochemical shifts in rats central nervous system during initial stage of increased oxygen pressure exposure A71-27810
Bacteria and yeast strains, fungi specimens and seaweed species high vacuum resistance, noting microorganisms interplanetary transport in outer space	A71-28689	Oxygen exposure effect on food consumption/ utilization efficiency, growth and biochemical parameters A71-29360
Germ survival and transport possibility in outer space, discussing spore survival under UV radiation	A71-28691	Intense muscular work adaptation in rats, reducing biochemical and adaptive changes and enhancing anaerobic processes A71-30552
Artificial changes in leukocyte count of rabbits [NASA-TT-F-13628]	N71-24737	Adrenal medulla biochemistry and morphology, discussing epinephrine synthesis control by glucocorticoid hormones A71-30809
Automated procedure for direct cell count of bacteria in urine by bioluminescence reaction of luciferase when mixed with ATP [NASA-TM-X-65521]	N71-25035	Separation methods such as centrifuging, ion exchanging, electrophoresis, and chromatography applied to biochemical materials /gels, proteins, amino acids/ N71-24466
<b>BACTERICIDES</b>		Biochemistry, molecular biology, radiochemistry, meteorology, soil science, and water pollution research and development and environmental engineering [AECL-3728] N71-24889
Mechanical sterilization and cleansing of Goldmann applanation tonometer prisms contaminated with coliphage, comparing with germicidal immersion	A71-29036	<b>BIOCONTROL SYSTEMS</b> Coronary blood flow regulation, discussing local and remote control mechanisms and disturbance effects due to obstructive arteriosclerosis A71-27860
<b>BAYES THEOREM</b>		
Bayesian decision making and learning in parametric pattern recognition problem for		

- Myocardium cells contractile activity control with frequency dependent self regulatory mechanism** A71-28383
- Blood liquid state control in sanguiferous canal as function of humoral feedback in coagulation, fibrinolytic and anticoagulation systems** A71-28718
- Food choice, consumption control and metabolism, discussing homeostatic alimentary theories, nerve signals and appetite regulation** A71-28719
- Whole body blood flow autoregulation relationship to hypertension in areflex dogs** A71-28953
- Biosynthesis control of melatonin and other methoxyindoles in mammalian pineal organ** A71-29631
- BIODYNAMICS**
- Animal urinary bladder mechanical properties from controlled stretch tests, identifying viscoelastic, plastoelastic and creep elements** A71-30566
- BIOELECTRIC POTENTIAL**
- Extraprimary /briefly latent/ postsynaptic negative component of evoked visual potential in cortex of nembutal anesthetized rabbits, using Alvar biophase oscillator** A71-27894
- Visual cortex neurons impulse activity and postsynaptic potential changes due to light stimuli from quasi-intracellular recordings** A71-28381
- Evoked brain potentials averaging in real time with computer linked by long distance communication lines** A71-28385
- Repetitive stimulation effects on auditory evoked potentials in cochlear nucleus, inferior colliculus and medial geniculate body of unanesthetized cats** A71-28892
- Electroencephalographic and evoked cortical potential correlates of reaction time and visual discrimination in humans** A71-29345
- Fly *Lucilia sericata* olfactory receptor and unit action potentials response to odor stimulation by homologous compounds** A71-30569
- BIOELECTRICITY**
- Human brain subcortical formations slow electrical processes during memory tests** A71-28377
- Natural sleep and wakefulness stages neurophysiology based on bioelectric activity spectral and correlation analyses** A71-28380
- Cat single optic nerve fibers receptive field observing functional organization and conduction velocity** A71-28458
- Cat type I and II optic nerve fibers response to flicker stimulation, noting receptive field organization, conduction velocity and temporal and spatial information processing** A71-28459
- Analog simulation of cardiac malfunctions associated with A-V conduction block and Wenckebach phenomenon, using P and R wave and internal function generators** A71-29001
- Existence of electric and magnetic field component associated with transmission of neuronal impulse studied in isolated sciatic nerves of frogs [NASA-CR-118334]** N71-25240
- BIOENGINEERING**
- Standard transducers applied to bioengineering research problems** N71-26366
- BIOINSTRUMENTATION**
- Development of apparatus and method for quantitatively measuring brain activity as automatic indication of sleep state and level of consciousness [NASA-CASE-MSC-13282-1]** N71-24729
- BIOLOGICAL EFFECTS**
- Biological tests of laser protective filters for eye as function of optical density and wavelength by sensitivity of in vivo ocular tissue response** A71-29035
- Microwave exposure effects on organisms and biological functions responses and thermal stresses as function of specific frequencies, power density and environmental temperature** A71-29325
- Psychobiological effects of prolonged bed rest in young healthy volunteers from EEG recording, psychological testing and psychomotor performance** A71-29363
- Annotated bibliography and indexes on Aerospace Medicine and Biology - March 1971 [NASA-SP-7011/87/]** N71-25745
- BIOLOGICAL EVOLUTION**
- Deleterious mutations and neutral substitutions, discussing molecular evolution model for DNA and proteins** A71-29096
- BIOLOGY**
- Analysis of conduct and effectiveness of biological research projects at military research facility [ORNL-TM-3218]** N71-25551
- BIOLUMINESCENCE**
- Luciferin fermentative oxidation method for adenosine triphosphate determination in extraterrestrial life detection, using extract of firefly luminescent organs** A71-28683
- Biochemical luminescence reaction for ferroporphyrin proteins determination in extraterrestrial life detection** A71-28684
- BIOMEDICAL DATA**
- Stochastic identification method for transforming ECG and VCG data to approximate diagnosis, using computerized dipole models** A71-29002
- Eight channel micropowered miniature biomedical PAM/FM telemetry system for implantation in research subjects aboard orbiting space station** A71-30930
- BIOMETRICS**
- Equipment for prolonged measurement of oxygen consumption, respiratory quotient and insensitive perspiration in man, noting cost reduction and operation simplification** A71-29316
- BIONICS**
- Grating pattern vision models, examining single neural network and multiple channel stimulus information processing** A71-28461
- Superposition model of spontaneous activity of cerebellar Purkinje cells for spike triggering** A71-29289
- Mathematical and mechanical models of human thermal system thermodynamic/transport processes and external regulation devices for single elements and entire body** A71-29403
- Heat transfer through human peripheral tissue based on one dimensional steady state continuum model combining effects of conduction, convection, vascular heat exchange and metabolism** A71-29502
- Human body attitude control in space, using ten body complex geometry system, noting astronaut training jig** A71-29832
- Electromagnetic field action on living organism simulated with infinite homogeneous cylinder in infinite cylindrical solenoid EM media** A71-30026
- Multicategory bibliographic classification of human behavior computer simulation models** A71-30461
- Application of dynamic programming and theory of control processes to biological phenomena including evolution of consciousness [TR-71-17]** N71-25937
- BIOSYNTHESIS**
- Hypothermia effect on lipid synthesis of hamster tissue following intravenous injection of acetate-C 14** A71-29582

- Biosynthesis control of melatonin and other methoxyindoles in mammalian pineal organ A71-29631
- BIOTELEMETRY**  
Compact head mounted six channel IC telemeter for artifact free EEG recording during laughter A71-28889
- BLADDER**  
Animal urinary bladder mechanical properties from controlled stretch tests, identifying viscoelastic, plastoelastic and creep elements A71-30566
- BLOOD**  
Human blood cholinergic complex during various physiological states, noting nonmediator action of acetylcholine A71-28384
- Blood liquid state control in sanguiferous canal as function of humoral feedback in coagulation, fibrinolytic and anticoagulation systems A71-28718
- Chronic hypoxia effects on blood oxygen and carbon dioxide tensions and pH changes in unanesthetized chickens at high altitude compared to sea level control A71-30565
- Pyruvate and lactate concentrations in muscle tissue and blood at rest and during exercise A71-31136
- BLOOD CIRCULATION**  
High altitude aerobic working capacity limitations, examining oxygen transport system and circulator factors A71-30276
- Vago sympathetic nerve trunk stimulation effects on pulmonary blood volume changes magnitudes and pattern in isolated perfused lungs A71-31135
- Application of cineholomicrography to study of microcirculation hemodynamics and related physiological studies of man and animal [AD-719401] N71-24684
- BLOOD COAGULATION**  
High altitude blood coagulation, determining hypercoagulability relationship to altered pulmonary hemodynamics A71-30278
- BLOOD FLOW**  
Coronary blood flow regulation, discussing local and remote control mechanisms and disturbance effects due to obstructive arteriosclerosis A71-27860
- Pulmonary circulation regulating factors, examining heart disease effects on lung capillary blood flow A71-27861
- Vessels mechanical behavior and blood flow dynamics in aorta bifurcation zone, using Navier- Stokes and continuity equations A71-28657
- Whole body blood flow autoregulation relationship to hypertension in areflex dogs A71-28953
- Carbon dioxide reduction and hemoglobin saturation rates of blood flow in curved channel membrane exchanger A71-29004
- Coronary blood flow response to acute and chronic hypoxia, observing vascular smooth muscle relaxation relation to released adenosine A71-30281
- Coronary vasculature development under hypoxia and pulmonary hypertension as possible cause of right ventricle phasic flow contour changes A71-30282
- High altitude acclimatized humans, noting decreased coronary blood flow and increased oxygen extraction A71-30283
- Short term high altitude exposure, determining coronary blood flow reduction relationship to cardiac output and stroke volume A71-30284
- BLOOD PLASMA**  
Proton release association with whole blood oxygenation at constant plasma pH and carbon dioxide partial pressure, using alkaline titration A71-28433
- Physiological and biochemical characterization of natriuretic hormone in human urine and blood plasma A71-28952
- Radiobiological plasma and blood volume measurements on humans and swine [CEA-R-4031] N71-24627
- BLOOD PRESSURE**  
Cardiac output and arterial pressure control in presence or absence of functional nervous system, discussing dog experiments A71-27839
- Preavoidance blood pressure elevations accompanied by heart rate decreases in dogs A71-28516
- Diastolic and mean blood pressure responses to exercise after beta-adrenergic blockade in normal and labile hypertensive subjects, using Trasicor A71-29320
- Systemic arterial blood pressure response to chronic high altitude and hypoxia effects A71-30280
- Factors affecting respiratory waves formation, modulating arterial blood pressure recordings and photoplethysmograms A71-30411
- Left ventricular power as product of pressure and volume change rate, relating peak values to end diastolic mass A71-30709
- BLOOD VESSELS**  
Extrinsic factors in pathogenesis of congenital heart diseases, considering morphogenetic processes in heart and great vessels development A71-27811
- Vessels mechanical behavior and blood flow dynamics in aorta bifurcation zone, using Navier- Stokes and continuity equations A71-28657
- BODY COMPOSITION (BIOLOGY)**  
Marmot ketone bodies concentration during activity, deep hibernation and early arousal, discussing increased oxidative metabolism effects A71-29125
- BODY TEMPERATURE**  
Cerebrum temperature variations and tissue insulating and heat conducting properties in ether anesthetized dogs with heads cooled by water stream A71-28029
- Helium for nitrogen substitution effects on body temperature of rats exposed to high carbon dioxide concentrations at different ambient temperatures A71-28407
- Heat balance of human body submerged in water, determining body temperature reduction as function of ambient temperature A71-28508
- Isolation technique for recording low level ECG and deep body temperature signals in animals exposed to large amplitude RF fields A71-28864
- Mathematical and mechanical models of human thermal system thermodynamic/transport processes and external regulation devices for single elements and entire body A71-29400
- Steady state and dynamic experiments to determine thermoregulatory heat production in human subjects [AD-720831] N71-25766
- BODY WEIGHT**  
Postflight metabolism and renal function of Soyuz 6, 7 and 8 crewmembers, associating weight loss during flight with water and salt discharges A71-28409
- BRAIN**  
Human brain subcortical formations slow electrical processes during memory tests A71-28377
- Brain subcortical structure neuronal assemblies impulse activity during sleeping and dreaming in patients treated with implanted electrodes A71-28378
- Evoked brain potentials averaging in real time with computer linked by long distance

communication lines	A71-28385	Chlorella biomass from pyrolysis and alumino gel column chromatography	A71-28407
Quantitative analysis of gamma aminobutyric acid in brain after locomotion and pure oxygen breathing [DLR-FB-71-03]	N71-24456	Extraterrestrial and earth life genesis, discussing carbon foundation, planetary conditions, water prerequisite and space exploration	A71-28679
Component connection schemes of brain for trainable feedback flight control system	N71-25326	Carbon dioxide reduction and hemoglobin saturation rates of blood flow in curved channel membrane exchanger	A71-29004
Monoamine oxidase inhibitors and norepinephrine decrease by reserpine affecting brain amines in altitude exposed rats [AD-720808]	N71-25957	Mathematical model for computerized evaluation of Sabatier reaction kinetics in oxygen recovery from carbon dioxide [NASA-CR-115026]	N71-26295
Induced fields and static heating patterns within multilayer spherical model of primate cranial structure [AD-720589]	N71-26168	Helium for nitrogen substitution effects on body temperature of rats exposed to high carbon dioxide concentrations at different ambient temperatures	A71-28402
Model describing symmetrical information processing along visual pathways of brain [NASA-CR-118517]	N71-26204	Hypercapnia in rat, measuring carbon dioxide concentration effect on tidal and minute volumes, respiratory rate, pH depression, blood gases, hematocrit and percent oxyhemoglobin saturation	A71-29364
<b>BRAIN DAMAGE</b>		Ion exchange resin carbon dioxide removal and concentration system for space cabin environments, describing monitoring and control instrumentation	A71-30313
Brain stem mechanisms underlying visual discrimination in rhesus monkeys subjected to bilateral lesions of the inferotemporal cortex, posterior thalamus or midbrain	A71-28807	Ion exchange resin carbon dioxide removal and concentration system for space cabin environments, describing monitoring and control instrumentation	A71-30567
<b>BRAIN STEM</b>		Carbon dioxide elimination across human skin, investigating perspiration effects	A71-30567
Brain stem mechanisms underlying visual discrimination in rhesus monkeys subjected to bilateral lesions of the inferotemporal cortex, posterior thalamus or midbrain	A71-28807	Proton release association with whole blood oxygenation at constant plasma pH and carbon dioxide partial pressure, using alkaline titration	A71-28433
<b>BREATHING APPARATUS</b>		Alveolar and arterial carbon dioxide partial pressure during rebreathing experiments at rest	A71-28435
Respiratory gas reaction mechanism on potassium superoxide in closed circuit breathing apparatus	A71-29113	Chronic hypoxia effects on blood oxygen and carbon dioxide tensions and pH changes in unanesthetized chickens at high altitude compared to sea level control	A71-30565
<b>BRIGHTNESS DISCRIMINATION</b>		Position, exercise and lung volume effects on healthy males pulmonary diffusing capacity for CO at rest and during exercise	A71-29493
Human visual system gate type lateral interaction to luminous intensity, noting visual field response to monocular viewing	A71-28460	Toxicological evaluation of CO in human and other mammals, considering pilot performance prediction for aircraft environment	A71-28902
Luminance and luminous flux discrimination in light and dark reared rats after early visual deprivation	A71-28810	Hypothermia effect on lipid synthesis of hamster tissue following intravenous injection of acetate-C 14	A71-29582
Signal and stimulus rate effects on long term human response to light signal intensity differences [RM-505]	N71-24955	Respiratory acid-base disturbances, studying deviations of bicarbonate ion vs pH pathway followed by buffered solution on carbon dioxide titration	A71-28434
<b>BRONCHIAL TUBE</b>		Ventricular septal defect, discussing incidence, human physiological responses, morbidity and mortality in various age groups	A71-27862
Pulmonary oxygen toxicity, considering composition of endobronchial saline extracts of rats and edema development	A71-29362	Ventricular mass estimation using electrocardiographic parameters	A71-29302
<b>BUFFERS (CHEMISTRY)</b>		Coronary vasculature development under hypoxia and pulmonary hypertension as possible cause of	
Respiratory acid-base disturbances, studying deviations of bicarbonate ion vs pH pathway followed by buffered solution on carbon dioxide titration	A71-28434		
<b>BURNING RATE</b>			
Gas composition, electrical ignition hazards, and combustion products from fire resistant material in diving atmospheres [AD-720352]	N71-25925		
<b>BUTYRIC ACID</b>			
Quantitative analysis of gamma aminobutyric acid in brain after locomotion and pure oxygen breathing [DLR-FB-71-03]	N71-24456		
<b>C</b>			
<b>CALIBRATING</b>			
Phonocardiogram simulator producing electrical voltage waves to control amplitude and duration between simulated sounds [NASA-CASE-XKS-10804]	N71-24606		
<b>CAPACITORS</b>			
Electrocardiograph electrodes with silicon-silicon oxide half-capacitor [AD-718958]	N71-24413		
<b>CAPILLARY FLOW</b>			
Pulmonary circulation regulating factors, examining heart disease effects on lung capillary blood flow	A71-27861		
<b>CARBOHYDRATES</b>			
Lipid, protein and carbohydrate concentrations in			

## SUBJECT INDEX

## CHEMORECEPTORS

- right ventricle phasic flow contour changes A71-30282
- High altitude residents cardiovascular evaluations, showing right ventricular enlargement and reactive pulmonary hypertension A71-30285
- Myocardial ischemia observations, utilizing morphologic and pathophysiologic correlations with cinecoronary arteriography, left ventriculography and hemodynamic examination A71-30287
- Left ventricular power as product of pressure and volume change rate, relating peak values to end diastolic mass A71-30709
- CARDIOGRAMS**
- Ultrasonic echocardiograms of anterior cusp of mitral valve in aortic valve disease A71-27814
- CARDIOLOGY**
- Cardiology - Conference, London, September 1970 A71-27858
  - Automation in cardiology, discussing analog and digital computer techniques for on-line hemodynamic analysis and collection and manipulation of cardiovascular data A71-27868
  - Automated data acquisition and analysis during cardiac catheterization, using photokymographic and analog magnetic tape recording system in conjunction with digital computer A71-29003
  - Development of system for identifying dynamic heart rate response to respiration [AD-719860] N71-24953
- CARDIOVASCULAR SYSTEM**
- Mild hypertension risks, presenting results of case studies over ten year period of mortality rate associated with cardiovascular diseases A71-27865
  - Automation in cardiology, discussing analog and digital computer techniques for on-line hemodynamic analysis and collection and manipulation of cardiovascular data A71-27868
  - Set and uncertainty as factors influencing anticipatory cardiovascular response in humans, monitoring heart rate and vasomotor activity A71-28809
  - Metabolic, ventilator and cardiovascular response during free swimming and treadmill walking, relating oxygen consumption to work intensity A71-29500
  - Hypoxia, high altitude and heart - Conference, Aspen, Colorado, January 1970 A71-30275
  - Effect of weightlessness on cardiovascular and uretic functions in human subjects [AD-719790] N71-24997
  - Physiological effects of positive acceleration on cardiovascular system based on requirements for cardiovascular simulation [AD-719902] N71-25674
  - Species comparison of cardiac hypertrophy in animals chronically exposed at sea level, 5,380, 11,140, and 14,110 feet [AD-720596] N71-26167
- CASE HISTORIES**
- Case histories of pilot failure during training or operational flight due to cerebral cortical dysfunction A71-29365
- CATALYTIC ACTIVITY**
- Catalytic effect of lanthanide hydroxides on formaldehyde conversion to pentoses and hexoses at 110 C in life support systems A71-28408
- CATHETERIZATION**
- Automated data acquisition and analysis during cardiac catheterization, using photokymographic and analog magnetic tape recording system in conjunction with digital computer A71-29003
- CELLS (BIOLOGY)**
- Myocardium cells contractile activity control with frequency dependent self regulatory mechanism A71-28383
  - Superposition model of spontaneous activity of cerebellar Purkinje cells for spike triggering A71-29289
- Mammalian neurons, neuroendocrine transducer /pinealocytes and adrenomedullary chromaffin/ and endocrine cells communication properties, noting signal transmission A71-30180
- CENTRAL NERVOUS SYSTEM**
- Functional-biochemical shifts in rats central nervous system during initial stage of increased oxygen pressure exposure A71-27810
- CENTRIFUGING**
- Separation methods such as centrifuging, ion exchanging, electrophoresis, and chromatography applied to biochemical materials /gels, proteins, amino acids/ N71-24466
- CEREBELLUM**
- Superposition model of spontaneous activity of cerebellar Purkinje cells for spike triggering A71-29289
- CEREBRAL CORTEX**
- Somatosensory cortical and cuneate evoked responses and EEG amplitude/frequency changes due to hypovolemic shock A71-27836
  - Extraprimary /briefly latent/ postsynaptic negative component of evoked visual potential in cortex of nembutal anesthetized rabbits, using Alvar biphasic oscillator A71-27894
  - Visual cortex neurons impulse activity and postsynaptic potential changes due to light stimuli from quasi-intracellular recordings A71-28381
  - Visual discrimination learning by monkeys with inferotemporal cortex lesions, using positive reinforcers and electric shock punishments A71-28804
  - Brain stem mechanisms underlying visual discrimination in rhesus monkeys subjected to bilateral lesions of the inferotemporal cortex, posterior thalamus or midbrain A71-28807
  - Evoked cortical responses to taste solutions of acid and salt applied to human tongue surface, using averaging technique A71-28887
  - Visual evoked cortical response in man related to rate, spatial frequency and wavelength of alternating barred pattern with background illumination A71-28888
  - Electroencephalographic and evoked cortical potential correlates of reaction time and visual discrimination in humans A71-29345
  - Case histories of pilot failure during training or operational flight due to cerebral cortical dysfunction A71-29365
  - Alpha rhythm activity, periodicity and mean frequency in cortex regions of healthy humans based on EEG frequency and correlation analyses A71-30551
- CEREBRUM**
- Cerebrum temperature variations and tissue insulating and heat conducting properties in ether anesthetized dogs with heads cooled by water stream A71-28029
  - Small spotted dogfish shark epiphysis cerebri, determining light sensitivity and properties A71-28456
- CHANNEL FLOW**
- Carbon dioxide reduction and hemoglobin saturation rates of blood flow in curved channel membrane exchanger A71-29004
- CHARGE DISTRIBUTION**
- ECG measuring locations number and positions for determination of time varying total body QRS surface potential distribution A71-28149
- CHEMORECEPTORS**
- Respiratory responses and hyperventilation mechanism during static muscular work in maximal voluntary contraction, noting chemoreceptor and alarm-defense reaction

Ventilatory control in acute hypoxia, detailing polycythemia effects on respiratory chemoreceptor sensitivity	A71-28436	N71-24737
Temperature, odor mixing and stimulation frequency effects on olfactory receptor potential of fly <i>Lucilia sericata</i>	A71-30289	
Fly <i>Lucilia sericata</i> olfactory receptor and unit action potentials response to odor stimulation by homologous compounds	A71-30568	
CHLORELLA Lipid, protein and carbohydrate concentrations in Chlorella biomass from pyrolysis and aluminogel column chromatography	A71-30569	
CHOLINE High motor stresses effects on muscle acetylcholine content, cholinesterase activity and localization, solitary contractions fusion and pessimal weakening	A71-28407	
CHOLINERGICS Human blood cholinergic complex during various physiological states, noting nonmediator action of acetylcholine	A71-30553	
CHOLINESTERASE Ionized air exposure effects on acetylcholine content and cholinesterase activity in mice, noting cholinergic and serotonergic interaction	A71-28384	
CHOLINESTERASE High motor stresses effects on muscle acetylcholine content, cholinesterase activity and localization, solitary contractions fusion and pessimal weakening	A71-28404	
CHONDRITES Hydrocarbons, amino acids and large molecule organic compounds formation in chondrite meteorites by abiogenetic reactions	A71-30553	
CHROMATOGRAPHY Separation methods such as centrifuging, ion exchanging, electrophoresis, and chromatography applied to biochemical materials /gels, proteins, amino acids/	A71-28692	
CINEMATOGRAPHY Application of cineholomicrography to study of microcirculation hemodynamics and related physiological studies of man and animal [AD-719401]	N71-24684	
CIRCADIAN RHYTHMS Diurnal rhythms of human physiological functions and performance during frequently alternating sleep-work cycles	A71-28410	
Rat liver and lung collagenase activity Circadian rhythm, noting maximum enzyme activity in early morning and minimum during afternoon and early evening	A71-28788	
Rat 24 hour clock inborn nature, discussing dependence on alternating light-dark periods for time measurement	A71-28801	
Circadian rhythm of leaves of <i>Phaseolus angularis</i> plants in controlled carbon dioxide and humidity environment	A71-29475	
CIRCULATORY SYSTEM Cardiac output and arterial pressure control in presence or absence of functional nervous system, discussing dog experiments	A71-27839	
CIVIL AVIATION Roentgenological analysis of paranasal sinuses in civil aviators, studying facial cavities infection	A71-29367	
CLEANLINESS Cleanliness control effects on aircraft components and immunization vaccine productions in Sweden [FOA-1-C-1325-76]	N71-26566	
CLINICAL MEDICINE Artificial changes in leukocyte count of rabbits		
[ NASA-TT-F-13628 ]		
CLOCKS Rat 24 hour clock inborn nature, discussing dependence on alternating light-dark periods for time measurement	A71-28801	
CLOSED ECOLOGICAL SYSTEMS Space flight factors effects on human physiology and psychology, discussing spacecraft gaseous medium control, food supply, closed ecological systems and weightlessness effects	A71-27876	
CLOTHING Zero gravity clothes washer utilizing principles of fluidics to provide washing action and reduction in number of components scale model [NASA-CR-114983]	N71-24455	
CLOUDS (METEOROLOGY) Optical effects observation by air traveler during takeoff, including haze or cloud droplet scattering, halos, shock wave shadows, shallow watercolors at twilight wedge	A71-29350	
COCHLEA Direct electrical stimulation of musculus tensor tympani or click elicited responses in cochlea and cochlear nucleus	A71-27832	
COCHLEA Repetitive stimulation effects on auditory evoked potentials in cochlear nucleus, inferior colliculus and medial geniculate body of unanesthetized cats	A71-28892	
COCHLEA Acoustic nerve, cochlear nucleus and superior olivary complex central projection, investigating ascending auditory system organization	A71-30255	
COCKPIT SIMULATORS Flight crew training ground school programs, featuring automated instruction in cockpit classroom with audio visual machines [SAE PAPER 710478]	A71-28343	
COEFFICIENT OF FRICTION Horizontal static forces exerted by men standing in common working positions on various surfaces including coefficients of friction between different floor and shoe materials [AD-720252]	N71-26196	
COENZYMES Acetyl-coenzyme A synthetase in aerobic yeast cells localization in microsomal fraction by density gradients	A71-31003	
COLD TOLERANCE Establishment of relationship between skin temperature and ability to tolerate cold and hot environments for human subjects [FAA-AM-71-4]	N71-24748	
COLLAGENS Rat liver and lung collagenase activity Circadian rhythm, noting maximum enzyme activity in early morning and minimum during afternoon and early evening	A71-28788	
COLOR VISION Human nervous reactions to monochromatic red, yellow, green and blue light for optimal color climate in spacecraft cabins	A71-28411	
COMMERCIAL AIRCRAFT V/S/TOL and supersonic commercial aircraft developments, comparing man and machine performance as information processing systems for aircraft control and navigation	A71-28486	
COMMUNICATION EQUIPMENT Voice communication, direction finding, and radio homing equipment development for search and rescue by air [AD-715310]	N71-24414	
COMPONENT RELIABILITY Cleanliness control effects on aircraft components and immunization vaccine productions in Sweden [FOA-1-C-1325-76]	N71-26566	
COMPUTER PROGRAMS Hybrid computer program for data reduction or on-line analysis of nystagmus during closed loop experiment involving visual and/or vestibular		

function	A71-29359	parameters and labyrinth nonauditory part, adaptation to Coriolis forces and response to ionizing radiation
<b>COMPUTER TECHNIQUES</b>		A71-28672
Computer analysis for normal ranges of orthogonal lead ECG parameters derived from modified axial lead systems	A71-27812	Coronary circulation
Three vs 12 lead electrocardiogram input for computer assisted interpretation	A71-27813	Coronary blood flow regulation, discussing local and remote control mechanisms and disturbance effects due to obstructive arteriosclerosis
Automation in cardiology, discussing analog and digital computer techniques for on-line hemodynamic analysis and collection and manipulation of cardiovascular data	A71-27868	A71-27860
Evoked brain potentials averaging in real time with computer linked by long distance communication lines	A71-28385	Sitting and supine position effect on exercise tolerance, heart rate, systolic pressure and respiration rate in male subjects with coronary insufficiency, noting onset of angina pectoris
<b>COMPUTERIZED SIMULATION</b>		A71-29303
Multicategory bibliographic classification of human behavior computer simulation models	A71-30461	Systemic arterial blood pressure response to chronic high altitude and hypoxia effects
Computer modeling of hippocampus and studies involving pattern recognition and information compression	N71-25864	A71-30280
[AD-720816]	N71-26076	Coronary blood flow response to acute and chronic hypoxia, observing vascular smooth muscle relaxation relation to released adenosine
Stochastic model for computerized simulation of closed man machine system operated by crew	[AD-720354]	A71-30281
Engine-airframe contribution to combat aircrew rescue simulation	[AD-720238]	Coronary vasculature development under hypoxia and pulmonary hypertension as possible cause of right ventricle phasic flow contour changes
CONFFERENCES		A71-30282
Cardiology - Conference, London, September 1970	A71-27858	High altitude acclimatized humans, noting decreased coronary blood flow and increased oxygen extraction
Aerospace medicine - Conference, Houston, April 1971	A71-29300	A71-30283
Hypoxia, high altitude and heart - Conference, Aspen, Colorado, January 1970	A71-30275	Short term high altitude exposure, determining coronary blood flow reduction relationship to cardiac output and stroke volume
<b>CONFINEMENT</b>		A71-30284
Fighting between male mice isolated at early age or reared in small groups, considering ontogenetic and experiential determinants	A71-28805	Myocardial ischemia and necrosis without major coronary arteries obstruction, investigating possible deranged hemoglobin-oxygen transport
<b>CONSCIOUSNESS</b>		A71-30286
Development of apparatus and method for quantitatively measuring brain activity as automatic indication of sleep state and level of consciousness	[NASA-CASE-MSC-13282-1]	Myocardial ischemia observations, utilizing morphologic and pathophysiologic correlations with cinecoronary arteriography left ventriculography and hemodynamic examination
Application of dynamic programming and theory of control processes to biological phenomena including evolution of consciousness	[TR-71-17]	A71-30287
CONTRACTION		CORROSION PREVENTION
Myocardium cells contractile activity control with frequency dependent self regulatory mechanism	A71-28383	Corrosion prevention by fungus-proofing - bibliography
<b>CONTROL EQUIPMENT</b>		[AD-720202]
Control analysis of regenerative spacecraft cabin atmosphere system for earth orbiting manned missions of up to 1 year duration	[NASA-TN-D-6139]	N71-26638
CONTROLLED ATMOSPHERES		COSMIC RAYS
Endogenous short period rhythms in rotational movements of unifoliate leaves of Phaseolus angularis Wight grown under controlled environmental conditions	A71-29476	Astronaut protection from solar flare high energy protons, discussing spacesuit, spacecraft orientation and solid, electrostatic, magnetic and plasma shielding
Human fluid balance in artificial environments, and influence of ambient temperature, water vapor pressure, total barometric pressure, wind velocity, and atmospheric gas composition	[NASA-CR-114977]	A71-29252
Gas composition, electrical ignition hazards, and combustion products from fire resistant material in diving atmospheres	[AD-720352]	CREATINE
CONVERSION TABLES		Anoxia induced ECG lesion current in conjunction with myocardial phosphorylcreatine collapse, discussing results with air and nitrogen ventilated guinea pigs
Human factors engineering manual including mathematical formulas, nomographs, conversion tables, units of measurement, and nomenclatures	[NASA-CR-114272]	A71-28506
<b>CORIOLIS EFFECT</b>		CREWS
Soviet book on vestibular reactions covering functional relationship between stimulus	N71-25943	Stochastic model for computerized simulation of closed man machine system operated by crew
		N71-26076
		CROP GROWTH
		Optimization of time intervals of conveyor harvestings and harvested age of oxygen producing plants for life support system
		A71-28406
		CROSS CORRELATION
		Lower extremities interlink angles correlation and cross correlation functions during walking for locomotor functions analysis in man
		A71-28382
		CULTURE TECHNIQUES
		Autotrophic cultivation of cereals with high photosynthetic activity under intensive illumination as biological components in life support systems
		A71-28405
		Stearothermophilus spore germination stimulation, investigating effects of preheating and amino acid and carbohydrate concentration
		A71-28695
		Survey and critique of bacterial growth quantitative determination methods including <i>Bacillus coli</i> direct microscopic morphology and growth measurement
		[NASA-TT-F-13652]
		N71-24584
		<b>CYBERNETICS</b>
		Component connection schemes of brain for

- trainable feedback flight control system N71-25326
- Algorithms of self organization, artificial intelligence, and tree search applied to various practical problems [AD-719930] N71-25652
- CYLINDRICAL BODIES**
- Electromagnetic field action on living organism simulated with infinite homogeneous cylinder in infinite cylindrical solenoid EM media A71-30026
- CYTOTOGENESIS**
- International control for experimentation with human eggs N71-24763
- D**
- DARK ADAPTATION**
- Night vision and dark adaptation of eye, noting sunlight effects on visual acuity A71-28392
- Dark adapted albino rats behavioral assessment, measuring absolute visual thresholds to white and colored light A71-28457
- Acuity-dark adaptation in strabismic amblyopia, discussing mechanisms for defects A71-28833
- Pupil size effect on dynamics of pupillary movements, considering reactions to light and darkness A71-29032
- Human electroretinographic dark adaptation recovery curves rod-cone break time dependence on bleach intensity A71-30503
- DATA PROCESSING**
- Automated data acquisition and analysis during cardiac catheterization, using photokyphographic and analog magnetic tape recording system in conjunction with digital computer A71-29003
- Spatial processing characteristics in perception of brief visual arrays [AD-719797] N71-25623
- Algorithms of self organization, artificial intelligence, and tree search applied to various practical problems [AD-719930] N71-25652
- Model describing symmetrical information processing along visual pathways of brain [NASA-CR-118517] N71-26204
- DATA PROCESSING EQUIPMENT**
- Multiclass pattern recognition in unstructured situations using a set of discriminant functions which partition feature space into regions [AD-720812] N71-25841
- Summary and coordination of several digital computer algorithms for information compression, structure analysis, and decision making [AD-720811] N71-25842
- DATA REDUCTION**
- Redundant information reduction during electrocardiograms analysis by Legendre polynomials, considering equivalent model in dipole and quadrupole form A71-28376
- Hybrid computer program for data reduction or on-line analysis of nystagmus during closed loop experiment involving visual and/or vestibular function A71-29359
- DEATH**
- Sudden death and syncope mechanism in aortic valve stenosis, noting presence of baroreceptors in left ventricular wall A71-29301
- DECISION MAKING**
- Bayesian model for group effects on individual decision making N71-25871
- DECISION THEORY**
- Multiclass pattern recognition in unstructured situations using a set of discriminant functions which partition feature space into regions [AD-720812] N71-25841
- Summary and coordination of several digital computer algorithms for information compression, structure analysis, and decision making [AD-720811] N71-25842
- Bayesian decision making and learning in parametric pattern recognition problem for continuous-time Markov process [AD-720810] N71-25847
- Bayesian algorithms for Markov chain pattern recognition problems [AD-720837] N71-25850
- DECOMPRESSION SICKNESS**
- Body fat influence with and without denitrogenation on decompression sickness in men exercising after abrupt exposure to altitude A71-29361
- Initial evaluation of revised helium-oxygen decompression tables [AD-719388] N71-24683
- DEGREES OF FREEDOM**
- Mathematical formulation of kinematic equations to describe motion of six degrees of freedom vibration table for use in research on human subjects [AD-720269] N71-26158
- DEHYDRATED FOOD**
- Compressed, coated, freeze dried, nonsweet, cheese and meat flavored snack cubes for Apollo food system [NASA-CR-114996] N71-25001
- DENITROGENATION**
- Body fat influence with and without denitrogenation on decompression sickness in men exercising after abrupt exposure to altitude A71-29361
- DENSITY MEASUREMENT**
- Pigeon vestibular apparatus fluids and structures physical properties, detailing specific gravity and viscosity of endolymph, perilymph and cupula A71-30467
- DEOXYRIBONUCLEIC ACID**
- Deleterious mutations and neutral substitutions, discussing molecular evolution model for DNA and proteins A71-29096
- DIAGNOSIS**
- Stochastic identification method for transforming ECG and VCG data to approximate diagnosis, using computerized dipole models A71-29002
- DIAPHRAGM (ANATOMY)**
- Reduced diaphragmatic muscle tissue resistance in rats during prolonged hypokinesia, showing sorption of basic vital neutral red stain A71-28417
- DIASTOLE**
- Diastolic and mean blood pressure responses to exercise after beta-adrenergic blockade in normal and labile hypertensive subjects, using Trasicor A71-29320
- Left ventricular power as product of pressure and volume change rate, relating peak values to end diastolic mass A71-30709
- DIETS**
- Solid and liquid diets during thiamine deficiency, noting hunger dependence on novelty A71-28808
- Soviet book on aviation medicine covering human anatomy and physiology, atmospheric physics, flight effects, respiratory systems, crew diets, etc A71-29943
- Mitotic response to various diets in normal and regenerating rat liver A71-30069
- Determination of growth patterns in rats fed on balanced diets differing by the presence of either oxidized or unoxidized fat [NASA-CR-114998] N71-24553
- DIFFUSIVITY**
- Lung diffusing capacity for oxygen during exercise and alveolar hypoxia measured without blood samples by ear oximeter A71-29492
- Dipoles**
- Dipole, quadrupole and octapole measurements in isolated beating hearts A71-28150

<b>DISPLAY DEVICES</b>		and cochlear nucleus	A71-27832
Head- or helmet-mounted display/control system in V/STOL aircraft for pilot workload and training reduction [AHS PREPRINT 532]	A71-31093	Behavioral arousal and EEG thresholds changes during sleep due to electrical and audio stimulation	A71-28379
<b>DISTILLATION</b>		Behavioral effects of electrically induced EEG abnormalities in inferotemporal and occipital cortex in monkeys on visual pattern discrimination and successive spatial reversals	A71-28806
Radioisotope fueled distillation system for reclaiming potable water from urine on prolonged space flight [AD-718965]	N71-24412	Respiratory wave basic pattern during cat diaphragm artificial activation by electric rectangular stimulus to phrenic nerves	A71-30412
<b>DIVING (UNDERWATER)</b>		ELECTRICAL MEASUREMENT	
Effect of immersion on exchange of oxygen in lung at simulated depth of 5 feet of sea water using hyperbaric chamber [AD-719389]	N71-24682	ECG measuring locations number and positions for determination of time varying total body QRS surface potential distribution	A71-28149
<b>DREAMS</b>		ELECTROACOUSTIC WAVES	
Brain subcortical structure neuronal assemblies impulse activity during sleeping and dreaming in patients treated with implanted electrodes	A71-28378	Phonocardiogram simulator producing electrical voltage waves to control amplitude and duration between simulated sounds [NASA-CASE-XKS-10804]	N71-24606
<b>DYNAMIC MODELS</b>		ELECTROCARDIOGRAPHY	
Mathematical and mechanical models of human thermal system thermodynamic/transport processes and external regulation devices for single elements and entire body	A71-29400	Computer analysis for normal ranges of orthogonal lead ECG parameters derived from modified axial lead systems	A71-27812
Human body attitude control in space, using ten body complex geometry system, noting astronaut training jig	A71-29832	Three vs 12 lead electrocardiogram input for computer assisted interpretation	A71-27813
<b>DYNAMIC PROGRAMMING</b>		ECG measuring locations number and positions for determination of time varying total body QRS surface potential distribution	A71-28149
Application of dynamic programming and theory of control processes to biological phenomena including evolution of consciousness [TR-71-17]	N71-25937	Redundant information reduction during electrocardiograms analysis by Legendre polynomials, considering equivalent model in dipole and quadrupole form.	A71-28376
<b>E</b>			
<b>EAR</b>		Anoxia induced ECG lesion current in conjunction with myocardial phosphorylcreatine collapse, discussing results with air and nitrogen ventilated guinea pigs	A71-28506
Endolymph and perilymph fluid systems pathophysiology from induced and spontaneous disorders changes observed in inner ear	A71-30254	Isolation technique for recording low level ECG and deep body temperature signals in animals exposed to large amplitude RF fields	A71-28864
<b>EAR PROTECTORS</b>		Stochastic identification method for transforming ECG and VCG data to approximate diagnosis, using computerized dipole models	A71-29002
Barmuff hearing protectors evaluation for attenuation of narrow band noise on experienced subjects	A71-30196	Ventricular mass estimation using electrocardiographic parameters	A71-29302
Weighting method for aircraft auditory risk limits when wearing ear protectors [AD-719861]	N71-25086	Electrocardiography from unprepared skin without paste, using integrated stainless steel electrode- buffer amplifiers	A71-29399
<b>EARTH ENVIRONMENT</b>		T wave abnormalities in electrocardiograms of athletes without organic heart diseases	A71-30708
Extraterrestrial and earth life genesis, discussing carbon foundation, planetary conditions, water prerequisite and space exploration	A71-28679	Electrocardiograph electrodes with silicon-silicon oxide half-capacitor [AD-718958]	N71-24413
<b>EARTH SURFACE</b>		Phonocardiogram simulator producing electrical voltage waves to control amplitude and duration between simulated sounds [NASA-CASE-XKS-10804]	N71-24606
Biological and geological aspects of soil science	N71-26456	<b>ELECTROCONDUCTIVITY</b>	
<b>EDEMA</b>		Analog simulation of cardiac malfunctions associated with A-V conduction block and Wenckebach phenomenon, using P and R wave and internal function generators	A71-29001
Pulmonary oxygen toxicity, considering composition of endobronchial saline extracts of rats and edema development	A71-29362	<b>ELECTRODES</b>	
<b>EDUCATION</b>		Electrocardiography from unprepared skin without paste, using integrated stainless steel electrode- buffer amplifiers	A71-29399
Human position in socialist productive system, examining pedagogical aspects of leadership	A71-28491	Electrocardiograph electrodes with silicon-silicon oxide half-capacitor [AD-718958]	N71-24413
<b>EFFERENT NERVOUS SYSTEMS</b>		Adhesive spray process for attaching biomedical skin electrodes [NASA-CASE-XFR-07658-1]	N71-26293
High motor stresses effects on muscle acetylcholine content, cholinesterase activity and localization, solitary contractions fusion and pessimal weakening	A71-30553		
<b>EJECTION INJURIES</b>			
Spinal column radiographic examination after pilot ejection, discussing vertebral injuries detection	A71-28510		
<b>ELECTRIC PULSES</b>			
Behavior of living pike fish under influence of electrical and mechanical stimulation of cupula of left horizontal ampulla and semicircular canal [NASA-TT-F-13665]	N71-25716		
<b>ELECTRIC STIMULI</b>			
Direct electrical stimulation of musculus tensor tympani on click elicited responses in cochlea			

<b>ELECTROENCEPHALOGRAPHY</b>	
Somatosensory cortical and cuneate evoked responses and EEG amplitude/frequency changes due to hypovolemic shock	A71-27836
Behavioral arousal and EEG thresholds changes during sleep due to electrical and audio stimulation	A71-28379
Behavioral effects of electrically induced EEG abnormalities in inferotemporal and occipital cortex in monkeys on visual pattern discrimination and successive spatial reversals	A71-28806
Evoked cortical responses to taste solutions of acid and salt applied to human tongue surface, using averaging technique	A71-28887
Visual evoked cortical response in man related to rate, spatial frequency and wavelength of alternating barred pattern with background illumination	A71-28888
Compact head mounted six channel IC telemeter for artifact free EEG recording during laughter	A71-28889
Electroencephalographic and evoked cortical potential correlates of reaction time and visual discrimination in humans	A71-29345
Psychobiological effects of prolonged bed rest in young healthy volunteers from EEG recording, psychological testing and psychomotor performance	A71-29363
Alpha rhythm activity, periodicity and mean frequency in cortex regions of healthy humans based on EEG frequency and correlation analyses	A71-30551
Computer modeling of hippocampus and studies involving pattern recognition and information compression [AD-720816]	N71-25864
<b>ELECTROMAGNETIC FIELDS</b>	
Isolation technique for recording low level ECG and deep body temperature signals in animals exposed to large amplitude RF fields	A71-28864
Electromagnetic field action on living organism simulated with infinite homogeneous cylinder in infinite cylindrical solenoid EM media	A71-30026
<b>ELECTROMYOGRAPHY</b>	
Surface electromyographic recordings on biceps and peripheral muscles during sustained isometric contractions	A71-29499
<b>ELECTROPHORESIS</b>	
Electrophoretic mobility of tear lysozyme in human subjects, noting applicability to genetics	A71-29033
Separation methods such as centrifuging, ion exchanging, electrophoresis, and chromatography applied to biochemical materials /gels, proteins, amino acids/	N71-24466
<b>ELECTROPHYSIOLOGY</b>	
Development of theory of neuromine nets containing recurrent inhibition and analysis of hippocampus model [AD-720815]	N71-25840
<b>ELECTRORETINOGRAPHY</b>	
Human electroretinographic dark adaptation recovery curves rod-cone break time dependence on bleach intensity	A71-30503
<b>ELECTROSTATIC SHIELDING</b>	
Astronaut protection from solar flare high energy protons, discussing spacesuit, spacecraft orientation and solid, electrostatic, magnetic and plasma shielding	A71-29252
<b>EMBRYOLOGY</b>	
International control for experimentation with human eggs	N71-24763
<b>ENDOCRINE GLANDS</b>	
Mammalian neurons, neuroendocrine transducer /pinealocytes and adrenomedullary chromaffin/ and endocrine cells communication properties, noting signal transmission	A71-30180
<b>ENDOCRINE SECRETIONS</b>	
Adrenocortical function in garden dormouse during autumnal preparation for hibernation, considering environmental temperature factors	A71-29315
<b>ENDOLYMPH</b>	
Endolymph and perilymph fluid systems pathophysiology from induced and spontaneous disorders changes observed in inner ear	A71-30254
Pigeon vestibular apparatus fluids and structures physical properties, detailing specific gravity and viscosity of endolymph, perilymph and cupula	A71-30467
<b>ENERGY CONVERSION EFFICIENCY</b>	
Polarization and energy conversion efficiency of yeast and <i>Bacillus</i> lactate fermentation for biochemical fuel cells	A71-26245
<b>ENVIRONMENT SIMULATION</b>	
Mars physical conditions compared to earth, simulating Martian conditions and low temperature and UV effects on proteins	A71-28688
Method and apparatus for applying compressional forces to skeletal structure of subject to simulate force during ambulatory conditions [NASA-CASE-ARC-10100-1]	N71-24738
<b>ENVIRONMENTAL CONTROL</b>	
Circadian rhythm of leaves of <i>Phaseolus angularis</i> plants in controlled carbon dioxide and humidity environment	A71-29475
Zero-gravity absorption refrigeration system design and performance testing for space station environmental control application [NASA-CR-103114]	N71-26390
<b>ENVIRONMENTAL ENGINEERING</b>	
Biochemistry, molecular biology, radiochemistry, meteorology, soil science, and water pollution research and development and environmental engineering [AECL-3728]	N71-24889
<b>ENVIRONMENTAL INDEX</b>	
Human factors engineering data for equipment design including anthropometry, environmental conditions, and physiological and behavioral factors [NASA-CR-114271]	N71-25944
<b>ENVIRONMENTAL TESTS</b>	
Design and tests of astronauts tool kit and tools for in-flight space maintenance [NASA-CR-103135]	N71-25533
<b>ENZYME ACTIVITY</b>	
Ionized air exposure effects on acetylcholine content and cholinesterase activity in mice, noting cholinergic and serotonergic interaction	A71-28404
Rat liver and lung collagenase activity Circadian rhythm, noting maximum enzyme activity in early morning and minimum during afternoon and early evening	A71-28788
High motor stresses effects on muscle acetylcholine content, cholinesterase activity and localization, solitary contractions fusion and pessimal weakening	A71-30553
Acetyl-coenzyme A synthetase in aerobic yeast cells localization in microsomal fraction by density gradients	A71-31003
<b>ENZYMOLOGY</b>	
Immunochemical investigation of dogfish pepsinogens A, C and D, determining characteristics in terms of immunodiffusion, immuno-electrophoresis, complement fixation and enzymic activity inhibition	A71-29480
<b>EPINEPHRINE</b>	
Adrenal medulla biochemistry and morphology, discussing epinephrine synthesis control by glucocorticoid hormones	A71-30809
<b>EQUIPMENT SPECIFICATIONS</b>	
Patient monitoring system design and equipment	

specifications with physiological response display device and warning system [NASA-CR-118645]	N71-25942	
<b>ERYTHROCYTES</b>		
Spleen role as erythrocytic depot in reticulocytic reaction to acute hypoxia in splenectomized dogs inhaling air with reduced partial oxygen pressure	A71-28418	A71-28680
<b>ESTERS</b>		
Ethyl esters of long chain fatty acids as biological products from gas chromatographic and mass spectrometric analyses on lipid fractions	A71-29352	A71-28681
<b>ETHYL COMPOUNDS</b>		
Ethyl esters of long chain fatty acids as biological products from gas chromatographic and mass spectrometric analyses on lipid fractions	A71-29352	A71-28682
<b>ETHYLENE OXIDE</b>		
Space objects sterilization techniques in Soviet Union and United States, covering hot air, ionizing radiation, UV light, ethylene oxide with or without Freon, etc	A71-28694	A71-28683
<b>ETIOLOGY</b>		
High altitude pulmonary edema in unacclimatized humans, discussing symptoms, etiology incidence and prevention	A71-30277	A71-28684
<b>EXERCISE (PHYSIOLOGY)</b>		
Baroreflex regulation of pulse interval during bicycling exercise, using systolic pressure-pulse relation to express reflex sensitivity	A71-28951	A71-28693
Body fat influence with and without denitrogenation on decompression sickness in men exercising after abrupt exposure to altitude	A71-29361	A71-29034
<b>EXHALATION</b>		
Exhaled air microimpurities composition of humans exposed to stress effects including bed rest, starvation, lyophilized diet feeding, high temperature and humidity	A71-28412	A71-24931
<b>EXHAUST GASES</b>		
Air pollution study of jet aircraft emissions in airport vicinity, involving exhaust gas testing, ground operations and passenger cabin measurements [SAE PAPER 710429]	A71-28315	A71-28833
<b>EXOBIOLOGY</b>		
Examination of data to be obtained by Mariner Mars 1971 infrared interferometer spectrometer experiment for inferential information on Mars surface biota [NASA-CR-118629]	N71-25715	A71-29031
Automated microbial metabolism life detection experiments for exobiological studies [NASA-CR-118659]	N71-26380	A71-29032
<b>EXPIRATION</b>		
Airway smooth muscle relaxation mechanical consequences concerning lung volumes, airway conductance, isovolume pressure flow, maximum expiratory flow volume and static lung recoil	A71-29497	A71-29801
<b>EXPIRED AIR</b>		
Exhaled air microimpurities composition of humans exposed to stress effects including bed rest, starvation, lyophilized diet feeding, high temperature and humidity	A71-28412	N71-24931
<b>EXTRATERRESTRIAL LIFE</b>		
Soviet papers on extraterrestrial life and detection methods covering biological conditions, extremal environmental factors and spacecraft sterilization	A71-28677	A71-29035
Hydrocarbons as foundation for life development universe, discussing chemical composition of galaxy, antimatter existence, interstellar medium and cosmic age factors	A71-28678	F
Extraterrestrial and earth life genesis, discussing carbon foundation, planetary conditions, water prerequisite and space exploration	A71-28679	
<b>F-4 AIRCRAFT</b>		
Measurements of aircrew total vibration exposure during low altitude, high speed flight in F-4C aircraft [AD-720271]	N71-26172	
F-4E aircraft in-flight television recording system for gunnery training [AD-720245]	N71-26174	
<b>FATS</b>		
Determination of growth patterns in rats fed on balanced diets differing by the presence of either oxidized or unoxidized fat		

[NASA-CR-114998]	N71-24553	
<b>FATTY ACIDS</b>		
Ethyl esters of long chain fatty acids as biological products from gas chromatographic and mass spectrometric analyses on lipid fractions	A71-29352	
<b>FEEDBACK CIRCUITS</b>		
Component connection schemes of brain for trainable feedback flight control system	N71-25326	
<b>FEMUR</b>		
Bending and torsional oscillations in rectangular specimens of femur and tibia, calculating elastic and shear moduli of compact bone tissues	A71-28658	
<b>FERMENTATION</b>		
Polarization and energy conversion efficiency of yeast and <i>Bacillus</i> lactate fermentation for biochemical fuel cells	N71-26245	
<b>FIBRIN</b>		
Blood liquid state control in sanguiferous canal as function of humoral feedback in coagulation, fibrinolytic and anticoagulation systems	A71-28718	
<b>FIRE PREVENTION</b>		
Hyperbaric fire safety research, including flame spread rates in helium and nitrogen diving atmospheres and minimum oxygen concentration for combustion in hyperbaric environments [AD-720353]	N71-25954	
<b>FISHES</b>		
Behavior of living pike fish under influence of electrical and mechanical stimulation of cupula of left horizontal ampulla and semicircular canal [NASA-TT-F-13665]	N71-25716	
<b>FLEXIBLE BODIES</b>		
Design and development of flexible tunnel for use by spacecrews in performing extravehicular activities [NASA-CASE-MSC-12243-1]	N71-24728	
<b>FLICKER</b>		
Cat type I and II optic nerve fibers response to flicker stimulation, noting receptive field organization, conduction velocity and temporal and spatial information processing	A71-28459	
<b>FLIGHT CLOTHING</b>		
Evaluation of protective clothing for flight crew members [AD-719106]	N71-24460	
<b>FLIGHT CREWS</b>		
Flight crew training, describing systematic tools, learning elements, managing systems and course organization [SAE PAPER 710474]	A71-28303	
Flight crew training ground school programs, featuring automated instruction in cockpit classroom with audio visual machines [SAE PAPER 710478]	A71-28343	
Personnel training in airline operations technology at Friedrich List Transportation Institute for aircraft pilots, flight safety engineers and systems engineers	A71-29143	
Aircraft personnel radiation hazards from radioactive luminous paint on instrument dials, signs and operational elements	A71-29145	
Soviet book on aviation medicine covering human anatomy and physiology, atmospheric physics, flight effects, respiratory systems, crew diets, etc	A71-29943	
Evaluation of protective clothing for flight crew members [AD-719106]	N71-24460	
Mathematic formulation of kinematic equations to describe motion of six degrees of freedom vibration table for use in research on human subjects [AD-720269]	N71-26158	
Measurements of aircrew total vibration exposure during low altitude, high speed flight in F-4C aircraft [AD-720271]	N71-26172	
Engine-airframe contribution to combat aircrew rescue simulation		
<b>FLIGHT FITNESS</b>		
Functions of medical services charged with ensuring flying personnel fitness, stressing aging process	A71-28487	
Airline flight personnel fitness downgrading, presenting statistical breakdown by age and physiological or psychological causes	A71-28509	
<b>FLIGHT SIMULATORS</b>		
Low altitude turbulence simulation in piloted flight simulators, discussing turbulence induced aircraft disturbances and effects on pilot	A71-29781	
Analysis of pilot training, career, education, and motivation related to role of research and flight simulators [AD-720797]	N71-25792	
<b>FLIGHT STRESS</b>		
Soviet book on aviation medicine covering human anatomy and physiology, atmospheric physics, flight effects, respiratory systems, crew diets, etc	A71-29943	
<b>FLIGHT STRESS (BIOLOGY)</b>		
Functional diagnostics in aerospace medicine for evaluating pilot ability and flight stresses	A71-28488	
<b>FLIGHT TRAINING</b>		
Flight crew training, describing systematic tools, learning elements, managing systems and course organization [SAE PAPER 710474]	A71-28303	
Flight crew training ground school programs, featuring automated instruction in cockpit classroom with audio visual machines [SAE PAPER 710478]	A71-28343	
Airline pilot training specific behavioral objective concept, noting introduction with Boeing 744 [SAE PAPER 710479]	A71-28344	
Flight training program for twin-engine transition, using commercially available training device [SAE PAPER 710480]	A71-28345	
Personnel training in airline operations technology at Friedrich List Transportation Institute for aircraft pilots, flight safety engineers and systems engineers	A71-29143	
Case histories of pilot failure during training or operational flight due to cerebral cortical dysfunction	A71-29365	
<b>FLOORS</b>		
Horizontal static forces exerted by men standing in common working positions on various surfaces including coefficients of friction between different floor and shoe materials [AD-720252]	N71-26196	
<b>FLOW CHARACTERISTICS</b>		
Vessels mechanical behavior and blood flow dynamics in aorta bifurcation zone, using Navier-Stokes and continuity equations	A71-28657	
<b>FLUIDICS</b>		
Zero gravity clothes washer utilizing principles of fluidics to provide washing action and reduction in number of components scale model [NASA-CR-114983]	N71-24455	
<b>FLYING PERSONNEL</b>		
Functions of medical services charged with ensuring flying personnel fitness, stressing aging process	A71-28487	
Near and intermediate vision in civil aircraft crews, presenting statistical evaluation of age factor effect on visual acuity in professional and nonprofessional personnel	A71-28507	
Airline flight personnel fitness downgrading, presenting statistical breakdown by age and physiological or psychological causes	A71-28509	
<b>FOOD INTAKE</b>		
Food choice, consumption control and metabolism, discussing homeostatic alimentary theories, nerve signals and appetite regulation		

FOOD AND WATER INTAKE CHANGES ASSOCIATED WITH INTERRUPTION OF HYPOTHALAMUS ANTERIOR OR POSTERIOR FIBER CONNECTIONS	A71-28719	GERMINATION	Stearothermophilus spore germination stimulation, investigating effects of preheating and amino acid and carbohydrate concentration
SOLID AND LIQUID DIETS DURING THIAMINE DEFICIENCY, NOTING HUNGER DEPENDENCE ON NOVELTY	A71-28802	GRAINS (FOOD)	Autotrophic cultivation of cereals with high photosynthetic activity under intensive illumination as biological components in life support systems
OXYGEN EXPOSURE EFFECT ON FOOD CONSUMPTION/ UTILIZATION EFFICIENCY, GROWTH AND BIOCHEMICAL PARAMETERS	A71-28808	GRAPHS (CHARTS)	Graphical predictions of human strengths for two handed IVA/EVA tasks including effects of differing gravities, populations, and space suit conditions [NASA-CR-115014]
FOREIGN BODIES	A71-29360	GRAVITATIONAL EFFECTS	Abdominal pressure decrease resulting in transpulmonary pressure crano-caudal gradient increase under gravitational effect simulation
ULTRASONIC/RADIOPHASIC METHOD FOR INTRAOCULAR FOREIGN BODY LOCALIZATION	A71-29031	GROUNDS CREWS	Aircraft personnel radiation hazards from radioactive luminous paint on instrument dials, signs and operational elements
FORMALDEHYDE	A71-28408	GROUP DYNAMICS	Fighting between male mice isolated at early age or reared in small groups, considering ontogenetic and experiential determinants
CATALYTIC EFFECT OF LANTHANIDE HYDROXIDES ON FORMALDEHYDE CONVERSION TO PENTOSES AND HEXOSES AT 110 C IN LIFE SUPPORT SYSTEMS	N71-25943	GROWTH	Survey and critique of bacterial growth quantitative determination methods including <i>Bacillus coli</i> direct microscopic morphology and growth measurement [NASA-TT-F-13652]
FROGS	N71-25240	GUNFIRE	Hydrostatic pressure effects on photosynthesis, growth, and oxygen production of algal cultures [AD-720401]
EXISTENCE OF ELECTRIC AND MAGNETIC FIELD COMPONENT ASSOCIATED WITH TRANSMISSION OF NEURONAL IMPULSE STUDIED IN ISOLATED SCIATIC NERVES OF FROGS	N71-25934	GUNNERY TRAINING	Noise hazard guide including damage risk criteria for steady state and impulse or gunfire noise
FUNGI	A71-28689	HABITUATION (LEARNING)	[AD-720202]
BACTERIA AND YEAST STRAINS, FUNGUS SPECIMENS AND SEAWEED SPECIES HIGH VACUUM RESISTANCE, NOTING MICROORGANISMS INTERPLANETARY TRANSPORT IN OUTER SPACE	N71-26638	HALOS	Optical effects observation by air traveler during takeoff, including haze or cloud droplet scattering, halos, shock wave shadows, shallow watercolors and twilight wedge
CORROSION PREVENTION BY FUNGUS-PROOFING - BIBLIOGRAPHY [AD-720202]	N71-26293	HAZARDS	Noise hazard guide including damage risk criteria for steady state and impulse or gunfire noise
GAS ANALYSIS	A71-30565	HAZE	Optical effects observation by air traveler during takeoff, including haze or cloud droplet scattering, halos, shock wave shadows, shallow watercolors and twilight wedge
CHRONIC HYPOXIA EFFECTS ON BLOOD OXYGEN AND CARBON DIOXIDE TENSIONS AND pH CHANGES IN UNANESTHETIZED CHICKENS AT HIGH ALTITUDE COMPARED TO SEA LEVEL CONTROL	N71-26293	HEAD MOVEMENT	Mathematical model for short term adaptation to vestibular stimuli, deriving transfer function relating angular velocities of nystagmus and head rotation
GAS COMPOSITION	A71-28412	HEAD-UP DISPLAYS	Head- or helmet-mounted display/control system in V/STOL aircraft for pilot workload and training reduction [AHS PREPRINT 532]
EXHALED AIR MICROIMPURITIES COMPOSITION OF HUMANS EXPOSED TO STRESS EFFECTS INCLUDING BED REST, STARVATION, LYOPHILIZED DIET FEEDING, HIGH TEMPERATURE AND HUMIDITY	A71-29501	HEARING	Quick-check audiometry reliability for testing
GAS EXCHANGE	A71-27810		
PULMONARY OXYGEN TOXICITY DEVELOPMENT RATE AND EFFECTS ON LUNG VOLUME AND ALVEOLAR-ARTERIAL GAS EXCHANGE DURING OXYGEN BREATHING	A71-28038		
GAS PRESSURE	A71-28038		
FUNCTIONAL-BIOCHEMICAL SHIFTS IN RATS CENTRAL NERVOUS SYSTEM DURING INITIAL STAGE OF INCREASED OXYGEN PRESSURE EXPOSURE	A71-28038		
Ar, N and Ne PARTIAL PRESSURE TOLERANCE IN DOGS, PLOTTING SATURATION CURVES	A71-28038		
GAS TRANSPORT	A71-30286		
MYOCARDIAL ISCHEMIA AND NECROSIS WITHOUT MAJOR CORONARY ARTERIES OBSTRUCTION, INVESTIGATING POSSIBLE DERANGED HEMOGLOBIN-OXYGEN TRANSPORT	A71-29493		
GASEOUS DIFFUSION	A71-29493		
POSITION, EXERCISE AND LUNG VOLUME EFFECTS ON HEALTHY MALES PULMONARY DIFFUSING CAPACITY FOR CO AT REST AND DURING EXERCISE	A71-29033		
GENETICS	A71-29033		
ELECTROPHORETIC MOBILITY OF TEAR LYSOZYME IN HUMAN SUBJECTS, NOTING APPLICABILITY TO GENETICS	N71-26456		
GEOMORPHOLOGY	N71-26456		
BIOLOGICAL AND GEOLOGICAL ASPECTS OF SOIL SCIENCE			

## HEART DISEASES

## SUBJECT INDEX

- hearing ability according to fitness regulations, comparing to complete tone and speech audiometry A71-29821
- Spatial and temporal discrimination functions in vision, audition and touch, establishing and controlling stimuli by vibrators A71-30252
- HEART DISEASES**
- Extrinsic factors in pathogenesis of congenital heart diseases, considering morphogenetic processes in heart and great vessels development A71-27811
- Ultrasonic echocardiograms of anterior cusp of mitral valve in aortic valve disease A71-27814
- Pulmonary circulation regulating factors, examining heart disease effects on lung capillary blood flow A71-27861
- Ventricular septal defect, discussing incidence, human physiological responses, morbidity and mortality in various age groups A71-27862
- Myocardial hypertrophy, discussing various forms and mechanisms in myocardial fiber growth and eventual failure A71-27863
- Cardiac hyperfunction, hypertrophy and insufficiency, discussing physiological mechanism and cause and effect relationships A71-27864
- Mild hypertension risks, presenting results of case studies over ten year period of mortality rate associated with cardiovascular diseases A71-27865
- Hypertension and heart or arterial disease relationships, discussing cause and effect mechanisms in coronary diseases A71-27866
- Myocardial infarction and coronary heart disease, considering incidence, mortality and preventive measures A71-27867
- Analog simulation of cardiac malfunctions associated with A-V conduction block and Wenckebach phenomenon, using P and R wave and internal function generators A71-29001
- Sudden death and syncope mechanism in aortic valve stenosis, noting presence of baroreceptors in left ventricular wall A71-29301
- Myocardial ischemia and necrosis without major coronary arteries obstruction, investigating possible deranged hemoglobin-oxygen transport A71-30286
- Myocardial ischemia observations, utilizing morphologic and pathophysiologic correlations with cinecoronary arteriography, left ventriculography and hemodynamic examination A71-30287
- T wave abnormalities in electrocardiograms of athletes without organic heart diseases A71-30708
- HEART FUNCTION**
- Cardiac output and arterial pressure control in presence or absence of functional nervous system, discussing dog experiments A71-27839
- Normal myocardium structure and function, discussing cardiac performance and output control A71-27859
- Cardiac hyperfunction, hypertrophy and insufficiency, discussing physiological mechanism and cause and effect relationships A71-27864
- Trained college and recreational swimmers cardiac output and maximum oxygen consumption during tethered swimming and treadmill running A71-29496
- Hypoxia, high altitude and heart - Conference, Aspen, Colorado, January 1970 A71-30275
- Left ventricular power as product of pressure and volume change rate, relating peak values to end diastolic mass A71-30709
- Development of system for identifying dynamic heart rate response to respiration [AD-719860] N71-24953
- HEART MINUTE VOLUME**
- Short term high altitude exposure, determining coronary blood flow reduction relationship to cardiac output and stroke volume A71-30284
- HEART RATE**
- Dipole, quadripole and octapole measurements in isolated beating hearts A71-28150
- Preavoidance blood pressure elevations accompanied by heart rate decreases in dogs A71-28516
- Set and uncertainty as factors influencing anticipatory cardiovascular response in humans, monitoring heart rate and vasomotor activity A71-28809
- Baroreflex regulation of pulse interval during bicycling exercise, using systolic pressure-pulse relation to express reflex sensitivity A71-28951
- Sitting and supine position effect on exercise tolerance, heart rate, systolic pressure and respiration rate in male subjects with coronary insufficiency, noting onset of angina pectoris A71-29303
- Heart rate variability in REM sleep, stage 4 sleep and wakefull state from ECG of normal males, calculating coefficient of temporal variability for each state A71-29319
- Short term high altitude exposure, determining coronary blood flow reduction relationship to cardiac output and stroke volume A71-30284
- Development of system for identifying dynamic heart rate response to respiration [AD-719860] N71-24953
- HEAT BALANCE**
- Heat balance of human body submerged in water, determining body temperature reduction as function of ambient temperature A71-28508
- HEAT TOLERANCE**
- Establishment of relationship between skin temperature and ability to tolerate cold and hot environments for human subjects [FAA-AM-71-4] N71-24748
- HEAT TRANSFER**
- Heat transfer through human peripheral tissue based on one dimensional steady state continuum model combining effects of conduction, convection, vascular heat exchange and metabolism A71-29502
- Regional control of skin temperature and heat transfer measurements of various body sections [AD-720830] N71-25953
- HELICOPTERS**
- Aircraft accident rescue system with helicopters, discussing cooperation between helicopter service and ground personnel A71-28721
- HELIUM**
- Ar, N and Ne partial pressure tolerance in dogs, plotting saturation curves A71-28038
- Helium for nitrogen substitution effects on body temperature of rats exposed to high carbon dioxide concentrations at different ambient temperatures A71-28402
- Initial evaluation of revised helium-oxygen decompression tables [AD-719388] N71-24683
- Measurement of oxygen effect and biological effectiveness of 910 MeV helium ion beam using cultured human kidney cells of interest in radiotherapeutic treatment of hypoxic tumors [UCRL-20190] N71-25241
- HELMETS**
- Venting device for pressurized space suit helmet to eliminate vomit expelled by crewmen [NASA-CASE-XMS-09652-1] N71-26333
- HEMATOCRIT RATIO**
- Long term immersion effects on human water-salt

## SUBJECT INDEX

## HUMAN CENTRIFUGES

- metabolism, noting increased erythrocyte water contents and hematocrit index A71-28403
- HEMODYNAMIC RESPONSES**
- Diastolic and mean blood pressure responses to exercise after beta-adrenergic blockade in normal and labile hypertensive subjects, using Trasicor A71-29320
- Myocardial ischemia observations, utilizing morphologic and pathophysiologic correlations with cinecoronary arteriography, left ventriculography and hemodynamic examination A71-30287
- HEMODYNAMICS**
- Coronary blood flow regulation, discussing local and remote control mechanisms and disturbance effects due to obstructive arteriosclerosis A71-27860
- Automation in cardiology, discussing analog and digital computer techniques for on-line hemodynamic analysis and collection and manipulation of cardiovascular data A71-27868
- High altitude blood coagulation, determining hypercoagulability relationship to altered pulmonary hemodynamics A71-30278
- Application of cineholomicrography to study of microcirculation hemodynamics and related physiological studies of man and animal [AD-719401] N71-24684
- HEMOGLOBIN**
- Carbon dioxide reduction and hemoglobin saturation rates of blood flow in curved channel membrane exchanger A71-29004
- Oxygen dissociation curve shift, hemoglobin affinity and diphosphoglycerate concentration in blood of acidotic and normal subjects at altitude A71-29494
- HIBERNATION**
- Marmot ketone bodies concentration during activity, deep hibernation and early arousal, discussing increased oxidative metabolism effects A71-29125
- Adrenocortical function in garden dormouse during autumnal preparation for hibernation, considering environmental temperature factors A71-29315
- HIGH ALTITUDE BREATHING**
- High altitude aerobic working capacity limitations, examining oxygen transport system and circulator factors A71-30276
- High altitude pulmonary edema in unacclimatized humans, discussing symptoms, etiology incidence and prevention A71-30277
- High altitude pulmonary edema syndrome, investigating increased alveolar-arterial oxygen gradients of humans during treadmill exercise A71-30279
- Systemic arterial blood pressure response to chronic high altitude and hypoxia effects A71-30280
- High altitude acclimatized humans, noting decreased coronary blood flow and increased oxygen extraction A71-30283
- Short term high altitude exposure, determining coronary blood flow reduction relationship to cardiac output and stroke volume A71-30284
- High altitude residents cardiovascular evaluations, showing right ventricular enlargement and reactive pulmonary hypertension A71-30285
- Human hypoxic ventilatory drive data for high altitude breathing, noting motivation reduction inversely related to time and altitude A71-30288
- HIGH ALTITUDE TESTS**
- Hypoxia, high altitude and heart - Conference, Aspen, Colorado, January 1970 A71-30275
- High altitude blood coagulation, determining hypercoagulability relationship to altered pulmonary hemodynamics A71-30278
- Chronic hypoxia effects on blood oxygen and carbon dioxide tensions and pH changes in unanesthetized chickens at high altitude compared to sea level control A71-30565
- HIGH SPEED**
- Measurements of aircrew total vibration exposure during low altitude, high speed flight in F-4C aircraft [AD-720271] N71-26172
- HIGH VACUUM**
- Bacteria and yeast strains, fungus specimens and seaweed species high vacuum resistance, noting microorganisms interplanetary transport in outer space A71-28689
- HIPPOCAMPUS**
- Development of theory of neuromine nets containing recurrent inhibition and analysis of hippocampus model [AD-720815] N71-25840
- Computer modeling of hippocampus and studies involving pattern recognition and information compression [AD-720816] N71-25864
- HOLOGRAPHY**
- Application of cineholomicrography to study of microcirculation hemodynamics and related physiological studies of man and animal [AD-719401] N71-24684
- HOMEOSTASIS**
- Food choice, consumption control and metabolism, discussing homeostatic alimentary theories, nerve signals and appetit' regulation A71-28712
- HONING**
- Voice communication, direction finding, and radio homing equipment development for search and rescue by air [AD-715310] N71-24414
- HORMONES**
- Physiological and biochemical characterization of natriuretic hormone in human urine and blood plasma A71-28952
- Adrenal medulla biochemistry and morphology, discussing epinephrine synthesis control by glucocorticoid hormones A71-30809
- HUMAN BEHAVIOR**
- Multicategory bibliographic classification of human behavior computer simulation models A71-30461
- Human factors engineering data for equipment design including anthropometry, environmental conditions, and physiological and behavioral factors [NASA-CR-114271] N71-25944
- HUMAN BEINGS**
- Method and apparatus for applying compressional forces to skeletal structure of subject to simulate force during ambulatory conditions [NASA-CASE-ARC-10100-1] N71-24738
- HUMAN BODY**
- Heat transfer through human peripheral tissue based on one dimensional steady state continuum model combining effects of conduction, convection, vascular heat exchange and metabolism A71-29502
- Human body attitude control in space, using ten body complex geometry system, noting astronaut training jig A71-29832
- Soviet book on aviation medicine covering human anatomy and physiology, atmospheric physics, flight effects, respiratory systems, crew diets, etc A71-29943
- Radiobiological plasma and blood volume measurements on humans and swine [CRA-R-4031] N71-24627
- HUMAN CENTRIFUGES**
- Rotation perception in dark and oculogyral illusion, using power law to describe subjective

vestibular sensation relation to angular acceleration stimulus pulses	A71-29327	A71-28410
<b>HUMAN FACTORS ENGINEERING</b>		
Human nervous reactions to monochromatic red, yellow green and blue light for optimal color climate in spacecraft cabins	A71-28411	N71-24437
Evaluation procedures for oxygen and protective aviation masks [AD-719105]	N71-24411	N71-24955
Human factor considerations applicable to aviation armament and avionics [AD-719108]	N71-24453	N71-25087
Evaluation of protective clothing for flight crew members [AD-719106]	N71-24460	N71-26076
Investigation of visual perception ability during acceleration and deceleration and thresholds for perceived motion changes	N71-24727	N71-26196
Design and development of flexible tunnel for use by spacecrews in performing extravehicular activities [NASA-CASE-MSC-12243-1]	N71-24728	N71-26385
Development of apparatus and method for quantitatively measuring brain activity as automatic indication of sleep state and level of consciousness [NASA-CASE-MSC-13282-1]	N71-24729	N71-26432
Establishment of relationship between skin temperature and ability to tolerate cold and hot environments for human subjects [FAA-AM-71-4]	N71-24748	N71-26622
Development of apparatus for studying stabilized image properties of human eye using photomultiplier tube and magnetic core array storage system [NASA-CR-114307]	N71-24931	A71-27876
Effect of weightlessness on cardiovascular and uretic functions in human subjects [AD-719790]	N71-24997	A71-28377
Human fluid balance in artificial environments, and influence of ambient temperature, water vapor pressure, total barometric pressure, wind velocity, and atmospheric gas composition [NASA-CR-114977]	N71-25000	A71-28403
Air ionization and effects of positive ions in air on man using Am-241 sources [ORNL-TR-2427]	N71-25438	A71-28411
Physiological effects of positive acceleration on cardiovascular system based on requirements for cardiovascular simulation [AD-719902]	N71-25674	A71-28412
Steady state and dynamic experiments to determine thermoregulatory heat production in human subjects [AD-720831]	N71-25766	A71-28463
Human factors engineering manual including mathematical formulas, nomographs, conversion tables, units of measurement, and nomenclatures [NASA-CR-114272]	N71-25943	A71-28464
Human factors engineering data for equipment design including anthropometry, environmental conditions, and physiological and behavioral factors [NASA-CR-114271]	N71-25944	A71-28508
Determination of acceleration limits for passenger comfort in urban transportation system	N71-26118	A71-28672
Aircraft survival equipment testing including maintainability, systems compatibility, human factors engineering, and reliability of rations, protective clothing, floats, and parachutes [AD-720225]	N71-26138	A71-28809
Graphical predictions of human strengths for two handed IVA/EVA tasks including effects of differing gravities, populations, and space suit conditions [NASA-CR-115014]	N71-26410	N71-28888
<b>HUMAN PATHOLOGY</b>		
Endolymph and perilymph fluid systems pathophysiology from induced and spontaneous disorders changes observed in inner ear	A71-30254	A71-29284
<b>HUMAN PERFORMANCE</b>		
Diurnal rhythms of human physiological functions and performance during frequently alternating sleep-work cycles		

- for each state A71-29319
- Diastolic and mean blood pressure responses to exercise after beta-adrenergic blockade in normal and labile hypertensive subjects, using Trasicor A71-29320
- Multiple starlike flashes and short streaks reported by subjects exposed to neutrons under 25 mev, discussing interaction with retinal rods by proton recoils A71-29353
- Human physiological responses comparison between work with concentric and eccentric muscle contractions, observing oxygen debt in short term exercise A71-29495
- Atmospheric turbulence induced aircraft vibrations effects on aircrrew performance, discussing physiological and psychological responses A71-29778
- Human electroretinographic dark adaptation recovery curves rod-cone break time dependence on bleach intensity A71-30503
- HUMAN TOLERANCES**
- Somatic and autonomic responses in vestibular tolerance of human subjects, using Coriolis acceleration test A71-28414
- High altitude pulmonary edema in unacclimatized humans, discussing symptoms, etiology incidence and prevention A71-30277
- Establishment of relationship between skin temperature and ability to tolerate cold and hot environments for human subjects [FAA-AM-71-4] N71-24748
- Annotated bibliography on human acclimation and acclimatization to heat [NASA-TM-X-62008] N71-25393
- Determination of acceleration limits for passenger comfort in urban transportation system N71-26118
- HUMAN WASTES**
- Carbon dioxide elimination across human skin, investigating perspiration effects A71-30567
- HYBRID COMPUTERS**
- Hybrid computer program for data reduction or on-line analysis of nystagmus during closed loop experiment involving visual and/or vestibular function A71-29359
- HYDROCARBONS**
- Hydrocarbons as foundation for life development universe, discussing chemical composition of galaxy, antimatter existence, interstellar medium and cosmic age factors A71-28678
- Hydrocarbons, amino acids and large molecule organic compounds formation in chondrite meteorites by abiogenetic reactions A71-28692
- HYDROSTATIC PRESSURE**
- Hydrostatic pressure effects on photosynthesis, growth, and oxygen production of algal cultures [AD-720401] N71-25867
- HYPERBARIC CHAMBERS**
- Effect of immersion on exchange of oxygen in lung at simulated depth of 5 feet of sea water using hyperbaric chamber [AD-719389] N71-24682
- Hyperbaric fire safety research, including flame spread rates in helium and nitrogen diving atmospheres and minimum oxygen concentration for combustion in hyperbaric environments [AD-720353] N71-25954
- HYPERCAPNIA**
- Hypercapnia in rat, measuring carbon dioxide concentration effect on tidal and minute volumes, respiratory rate, pH depression, blood gases, hematocrit and percent oxyhemoglobin saturation A71-29364
- Factors affecting respiratory waves formation, modulating arterial blood pressure recordings and photoplethysmograms A71-30411
- HYPEROXIA**
- Pulmonary oxygen toxicity development rate and effects on lung volume and alveolar-arterial gas exchange during oxygen breathing A71-29501
- HYPERTENSION**
- Mild hypertension risks, presenting results of case studies over ten year period of mortality rate associated with cardiovascular diseases A71-27865
- Hypertension and heart or arterial disease relationships, discussing cause and effect mechanisms in coronary diseases A71-27866
- Whole body blood flow autoregulation relationship to hypertension in areflex dogs A71-28953
- Diastolic and mean blood pressure responses to exercise after beta-adrenergic blockade in normal and labile hypertensive subjects, using Trasicor A71-29320
- Coronary vasculature development under hypoxia and pulmonary hypertension as possible cause of right ventricle phasic flow contour changes A71-30282
- High altitude residents cardiovascular evaluations, showing right ventricular enlargement and reactive pulmonary hypertension A71-30285
- HYPERVENTILATION**
- Respiratory responses and hyperventilation mechanism during static muscular work in maximal voluntary contraction, noting chemoreceptor and alarm-defense reaction A71-28436
- HYPOKINESIA**
- Reduced diaphragmatic muscle tissue resistance in rats during prolonged hypokinesia, showing sorption of basic vital neutral red stain A71-28417
- HYPOTHALAMUS**
- Food and water intake changes associated with interruption of hypothalamus anterior or posterior fiber connections A71-28802
- HYPOTHERMIA**
- Hypothermia effect on lipid synthesis of hamster tissue following intravenous injection of acetate-C 14 A71-29582
- HYPOTHESES**
- Respiratory air flow optimal regulation hypothesis, testing analytic prediction model results with experiment under stress and rest conditions A71-29491
- HYPOVOLEMIA**
- Somatotensory cortical and cuneate evoked responses and EEG amplitude/frequency changes due to hypovolemic shock A71-27836
- HYPOXIA**
- Hypoxia effects on organism resistance and immunobiological reactivity, noting bacterial and protozoa infections aggravation A71-28401
- Spleen role as erythrocytic depot in reticulocytic reaction to acute hypoxia in splenectomized dogs inhaling air with reduced partial oxygen pressure A71-28418
- Lung diffusing capacity for oxygen during exercise and alveolar hypoxia measured without blood samples by ear oximeter A71-29492
- Hypoxia, high altitude and heart - Conference, Aspen, Colorado, January 1970 A71-30275
- Systemic arterial blood pressure response to chronic high altitude and hypoxia effects A71-30280
- Coronary blood flow response to acute and chronic hypoxia, observing vascular smooth muscle relaxation relation to released adenosine A71-30281
- Coronary vasculature development under hypoxia and pulmonary hypertension as possible cause of right ventricle phasic flow contour changes A71-30282

Human hypoxic ventilatory drive data for high altitude breathing, noting motivation reduction inversely related to time and altitude	A71-30282	INORGANIC PEROXIDES Respiratory gas reaction mechanism on potassium superoxide in closed circuit breathing apparatus
Ventilatory control in acute hypoxia, detailing polycythemia effects on respiratory chemoreceptor sensitivity	A71-30288	A71-29113
Chronic hypoxia effects on blood oxygen and carbon dioxide tensions and pH changes in unanesthetized chickens at high altitude compared to sea level control	A71-30289	INSECTS Sensory modes of flies, bees, and moths applied to target acquisition and tracking
	A71-30565	[AD-720412]
		N71-25958
<b>IMAGE CONTRAST</b>		<b>INSTRUMENT ERRORS</b>
Spatio-temporal patterns in visual contrast sensitivity, noting exaggerated eye movements effects	A71-28462	Eye accommodation range limiting for increased adjustment accuracy of optico-mechanical instruments, considering spectacle lens, telescope, magnifying glass and microscope
Visual perception theoretical models for liminal contrast prediction	A71-29442	A71-30416
<b>IMAGE INTENSIFIERS</b>		<b>INTEGRATED CIRCUITS</b>
Picture processing and image evaluation [FOA-2-C-2354-72]	N71-26597	Compact head mounted six channel IC telemeter for artifact free EEG recording during laughter
<b>IMAGING TECHNIQUES</b>		A71-28889
Picture processing and image evaluation [FOA-2-C-2354-72]	N71-26597	<b>INTERNATIONAL COOPERATION</b>
<b>IMMUNOLOGY</b>		International control for experimentation with human eggs
Hypoxia effects on organism resistance and immunobiological reactivity, noting bacterial and protozoa infections aggravation	A71-28401	N71-24763
Immunochemical investigation of dogfish pepsinogens A, C and D, determining characteristics in terms of immunodiffusion, immuno-electrophoresis, complement fixation and enzymic activity inhibition	A71-29480	<b>INTRAOCCULAR PRESSURE</b>
<b>IMPULSES</b>		Mechanical sterilization and cleansing of Goldmann applanation tonometer prisms contaminated with coliphage, comparing with germicidal immersion
Existence of electric and magnetic field component associated with transmission of neuronal impulse studied in isolated sciatic nerves of frogs [NASA-CR-118334]	N71-25240	A71-29036
<b>IN-FLIGHT MONITORING</b>		<b>ION BEAMS</b>
F-4E aircraft in-flight television recording system for gunnery training [AD-720245]	N71-26174	Measurement of oxygen effect and biological effectiveness of 910 MeV helium ion beam using cultured human kidney cells of interest in radiotherapeutic treatment of hypoxic tumors
<b>INDEXES (DOCUMENTATION)</b>		[UCRL-20190]
Annotated bibliography and indexes on Aerospace Medicine and Biology - March 1971 [NASA-SP-7011/87/]	N71-25745	N71-25241
<b>INDOLES</b>		<b>ION EXCHANGE RESINS</b>
Biosynthesis control of melatonin and other methoxyindoles in mammalian pineal organ	A71-29631	Ion exchange resin carbon dioxide removal and concentration system for space cabin environments, describing monitoring and control instrumentation
<b>INDUCTION HEATING</b>		A71-30313
Induced fields and static heating patterns within multilayer spherical model of primate cranial structure [AD-720589]	N71-26168	<b>ION EXCHANGING</b>
<b>INSERT ATMOSPHERE</b>		Separation methods such as centrifuging, ion exchanging, electrophoresis, and chromatography applied to biochemical materials /gels, proteins, amino acids/
Helium for nitrogen substitution effects on body temperature of rats exposed to high carbon dioxide concentrations at different ambient temperatures	A71-28402	N71-24466
<b>INFARCTION</b>		<b>ION IRRADIATION</b>
Myocardial infarction and coronary heart disease, considering incidence, mortality and preventive measures	A71-27867	Elimination of microbial and viral agents from spacecraft water systems by silver ions from electrolytic ion generator
<b>INFECTIOUS DISEASES</b>		[NASA-CR-114978]
Hypoxia effects on organism resistance and immunobiological reactivity, noting bacterial and protozoa infections aggravation	A71-28401	N71-24436
<b>INFLATABLE STRUCTURES</b>		<b>IONIZATION</b>
Design and development of pressurized suit with improved air retention and restraint coverage with passive ventilation, maximum mobility, and long term unpressurized comfort [AD-720827]	N71-25863	Air ionization and effects of positive ions in air on man using Am-241 sources
<b>INJECTION</b>		[ORNL-TR-2427]
Artificial changes in leukocyte count of rabbits [NASA-TT-F-13628]	N71-24737	N71-25438
		<b>IONIZED GASES</b>
		Ionized air exposure effects on acetylcholine content and cholinesterase activity in mice, noting cholinergic and serotonergic interaction
		A71-28404
		<b>IONIZING RADIATION</b>
		Soviet book on vestibular reactions covering functional relationship between stimulus parameters and labyrinth nonauditory part, adaptation to Coriolis forces and response to ionizing radiation
		A71-28672
		Space objects sterilization techniques in Soviet Union and United States, covering hot air, ionizing radiation, UV light, ethylene oxide with or without Freon, etc
		A71-28694
		<b>ISCHEMIA</b>
		Myocardial ischemia and necrosis without major coronary arteries obstruction, investigating possible deranged hemoglobin-oxygen transport
		A71-30286
		<b>JET AIRCRAFT</b>
		Air pollution study of jet aircraft emissions in airport vicinity, involving exhaust gas testing, ground operations and passenger cabin measurements
		J

[SAE PAPER 710429] A71-28315  
 Jet pilots training technologies, discussing multimedia instruction, psychological stress reduction, self study, airborne video application and simulation  
 [SAE PAPER 710477] A71-28342  
 Large subsonic jet aircraft civil pilots performance under physiological and psychological stresses induced during severe atmospheric turbulence A71-29783

JET EXHAUST  
 Air pollution study of jet aircraft emissions in airport vicinity, involving exhaust gas testing, ground operations and passenger cabin measurements  
 [SAE PAPER 710429] A71-28315  
 JOINTS (ANATOMY)  
 Joint action of various afferents in regulation of human posture, considering appropriate differential reactions A71-27833  
 Cord restraint system for pressure suit joints [NASA-CASE-XMS-9635] N71-24623

**K**

KETONES  
 Marmot ketone bodies concentration during activity, deep hibernation and early arousal, discussing increased oxidative metabolism effects A71-29125  
 KIDNEYS  
 Dietary pyridoxal deficiency causing amino acid content reduction in liver, kidney, brain and heart tissues A71-27837

KINEMATIC EQUATIONS  
 Mathematic formulation of kinematic equations to describe motion of six degrees of freedom vibration table for use in research on human subjects [AD-720269] N71-26158

**L**

LACTATES  
 Pyruvate and lactate concentrations in muscle tissue and blood at rest and during exercise A71-31136  
 LANTHANUM COMPOUNDS  
 Catalytic effect of lanthanide hydroxides on formaldehyde conversion to pentoses and hexoses at 110 C in life support systems A71-28408

LASER OUTPUTS  
 Biological tests of laser protective filters for eye as function of optical density and wavelength by sensitivity of in vivo ocular tissue response A71-29035

LAUGHING  
 Compact head mounted six channel IC telemeter for artifact free EEG recording during laughter A71-28889  
 LEARNING  
 Learning sets development relation to transfer suppression, discussing previously learned discriminations retention A71-28803  
 Visual discrimination learning by monkeys with inferotemporal cortex lesions, using positive reinforcers and electric shock punishments A71-28804

LEAVES  
 Circadian rhythm of leaves of Phaseolus angularis plants in controlled carbon dioxide and humidity environment A71-29475  
 LEG (ANATOMY)  
 Lower extremities interlink angles correlation and cross correlation functions during walking for locomotor functions analysis in man A71-28382

LEGENDRE FUNCTIONS  
 Redundant information reduction during electrocardiograms analysis by Legendre polynomials, considering equivalent model in

dipole and quadrupole form A71-28376  
 LESIONS  
 Visual discrimination learning by monkeys with inferotemporal cortex lesions, using positive reinforcers and electric shock punishments A71-28804  
 Brain stem mechanisms underlying visual discrimination in rhesus monkeys subjected to bilateral lesions of the inferotemporal cortex, posterior thalamus or midbrain A71-28807  
 LEUKOCYTES  
 Artificial changes in leukocyte count of rabbits [NASA-TT-F-13628] N71-24737  
 LIFE DETECTORS  
 Soviet papers on extraterrestrial life and detection methods covering biological conditions, extremal environmental factors and spacecraft sterilization A71-28677  
 Chemical evolution and extraterrestrial life detection, noting cell proliferation methods, automatic biological stations and Mars microorganisms A71-28680  
 Optimal mineral-organic nutrient medium and soil selection for microorganism detection on Mars A71-28681  
 Visible and UV photometric recording of microorganism reproduction in liquid medium for application to Mars extraterrestrial life detection A71-28682  
 Luciferin fermentative oxidation method for adenosine triphosphate determination in extraterrestrial life detection, using extract of firefly luminescent organs A71-28683  
 Biochemical luminescence reaction for ferro-porphyrin proteins determination in extraterrestrial life detection A71-28684  
 Automated microbial metabolism life detection experiments for exobiological studies [NASA-CR-118659] N71-26380  
 LIFE SUPPORT SYSTEMS  
 Autotrophic cultivation of cereals with high photosynthetic activity under intensive illumination as biological components in life support systems A71-28405  
 Optimization of time intervals of conveyor harvestings and harvested age of oxygen producing plants for life support system A71-28406  
 Catalytic effect of lanthanide hydroxides on formaldehyde conversion to pentoses and hexoses at 110 C in life support systems A71-28408  
 Man and equipment instrumentation in simulated space environment, considering training and interface of man and life support systems A71-30312  
 Elimination of microbial and viral agents from spacecraft water systems by silver ions from electrolytic ion generator [NASA-CR-114978] N71-24436  
 Design and development of flexible tunnel for use by spacecrews in performing extravehicular activities [NASA-CASE-MSC-12243-1] N71-24728  
 Development of improved convolute section for pressurized suits to provide high degree of mobility in response to minimum of applied torque [NASA-CASE-XMS-09637-1] N71-24730  
 Design and development of pressurized suit with improved air retention and restraint coverage with passive ventilation, maximum mobility, and long term unpressurized comfort [AD-720827] N71-25863  
 LIGHT (VISIBLE RADIATION)  
 Dark adapted albino rats behavioral assessment, measuring absolute visual thresholds to white and colored light A71-28457  
 LIGHT ADAPTATION  
 Pupil size effect on dynamics of pupillary

movements, considering reactions to light and darkness	A71-29032	maintainability, systems compatibility, human factors engineering, and reliability of rations, protective clothing, floats, and parachutes [AD-720225]
<b>LINEAR SYSTEMS</b>		N71-26138
Linear transfer function for describing human response to aircraft control	N71-24710	Biosynthesis control of melatonin and other methoxyindoles in mammalian pineal organ
<b>LIPID METABOLISM</b>		A71-29631
Hypothermia effect on lipid synthesis of hamster tissue following intravenous injection of acetate-C 14	A71-29582	Studies on anatomy and mechanisms of mammalian sensory systems including vision, audition and touch
<b>LIPIDS</b>		A71-30251
Lipid, protein and carbohydrate concentrations in Chlorella biomass from pyrolysis and alumino gel column chromatography	A71-28407	<b>MAN MACHINE SYSTEMS</b>
Ethyl esters of long chain fatty acids as biological products from gas chromatographic and mass spectrometric analyses on lipid fractions	A71-29352	Quantitative performance evaluation of man machine systems in stochastic environments, deriving simulation algorithm
<b>LIVER</b>		A71-29286
Dietary pyridoxal deficiency causing amino acid content reduction in liver, kidney, brain and heart tissues	A71-27837	Man and equipment instrumentation in simulated space environment, considering training and interface of man and life support systems
Rat liver and lung collagenase activity Circadian rhythm, noting maximum enzyme activity in early morning and minimum during afternoon and early evening	A71-28788	A71-30312
Mitotic response to various diets in normal and regenerating rat liver	A71-30069	Stochastic model for computerized simulation of closed man machine system operated by crew [AD-720354]
<b>LONG TERM EFFECTS</b>		N71-26076
Signal and stimulus rate effects on long term human response to light signal intensity differences [RN-505]	N71-24955	<b>MANAGEMENT SYSTEMS</b>
<b>LOW ALTITUDE</b>		Flight crew training, describing systematic tools, learning elements, managing systems and course organization [SAE PAPER 710474]
Measurements of aircrew total vibration exposure during low altitude, high speed flight in F-4C aircraft [AD-720271]	N71-26172	A71-28303
<b>LOW LEVEL TURBULENCE</b>		<b>MANNED SPACE FLIGHT</b>
Low altitude turbulence simulation in piloted flight simulators, discussing turbulence induced aircraft disturbances and effects on pilot	A71-29781	Microbiological respirometer for oxidative metabolism for plants and small animals, considering manned space flight applications
<b>LOWER ATMOSPHERE</b>		A71-30344
Biological and geological aspects of soil science	N71-26456	<b>MANUAL CONTROL</b>
<b>LUMINANCE</b>		Model for task interference with pilot performance in multivariable manual control systems [NASA-CR-1746]
Luminance and luminous flux discrimination in light and dark reared rats after early visual deprivation	A71-28810	N71-26160
<b>LUMINOUS INTENSITY</b>		<b>MANUALS</b>
Human visual system gate type lateral interaction to luminous intensity, noting visual field response to monocular viewing	A71-28460	Evaluation procedures for oxygen and protective aviation masks [AD-719105]
Luminance and luminous flux discrimination in light and dark reared rats after early visual deprivation	A71-28810	N71-24411
<b>LUNGS</b>		<b>MARKOV CHAINS</b>
Rat liver and lung collagenase activity Circadian rhythm, noting maximum enzyme activity in early morning and minimum during afternoon and early evening	A71-28788	Bayesian algorithms for Markov chain pattern recognition problems [AD-720837]
Lung diffusing capacity for oxygen during exercise and alveolar hypoxia measured without blood samples by ear oximeter	A71-29492	N71-25850
Vago sympathetic nerve trunk stimulation effects on pulmonary blood volume changes magnitudes and pattern in isolated perfused lungs	A71-31135	<b>MARKOV PROCESSES</b>
<b>LYSOZYME</b>		Bayesian decision making and learning in parametric pattern recognition problem for continuous-time Markov process [AD-720810]
Electrophoretic mobility of tear lysozyme in human subjects, noting applicability to genetics	A71-29033	N71-25847
<b>MAINTAINABILITY</b>		<b>MARS (PLANET)</b>
Aircraft survival equipment testing including		Chemical evolution and extraterrestrial life detection, noting cell proliferation methods, automatic biological stations and Mars microorganisms
<b>M</b>		A71-28680
<b>MARS ENVIRONMENT</b>		Visible and UV photometric recording of microorganism reproduction in liquid medium for application to Mars extraterrestrial life detection
Simple organisms resistance and adaptation to low pressure, anoxia, intense cooling, UV irradiation and Mars conditions		A71-28682
Mars physical conditions compared to earth, simulating Martian conditions and low temperature and UV effects on proteins		Examination of data to be obtained by Mariner Mars 1971 infrared interferometer spectrometer experiment for inferential information on Mars surface biota [NASA-CR-118629]
<b>MARS SURFACE</b>		N71-25715
Optimal mineral-organic nutrient medium and soil selection for microorganism detection on Mars		<b>MARS 71 PROJECT</b>
Kerophyte soil microorganisms reproductive stability in artificial Mars environment chamber at maximum hygroscopic moisture		Examination of data to be obtained by Mariner Mars 1971 infrared interferometer spectrometer experiment for inferential information on Mars surface biota
<b>M</b>		A71-28681
<b>MAINTAINABILITY</b>		A71-28680
Aircraft survival equipment testing including		

[NASA-CR-118629]	N71-25715	considering manned space flight applications
<b>MATHEMATICAL MODELS</b>		A71-30344
Mathematical and mechanical models of human thermal system thermodynamic/transport processes and external regulation devices for single elements and entire body	A71-29400	Automated microbial metabolism life detection experiments for exobiological studies
Visual perception theoretical models for liminal contrast prediction	A71-29442	[NASA-CR-118659] N71-26380
Respiratory air flow optimal regulation hypothesis, testing analytic prediction model results with experiment under stress and rest conditions	A71-29491	Development of clinical pathology procedures for detection of diseases in germfree mice and detection of titanium in lymphoid structures of hamsters, mice, and rats
Mathematical model for short term adaptation to vestibular stimuli, deriving transfer function relating angular velocities of nystagmus and head rotation	A71-30250	[NASA-CR-118671] N71-26399
Model for task interference with pilot performance in multivariable manual control systems [NASA-CR-1746]	N71-26160	<b>MICROORGANISMS</b>
<b>MECHANICAL PROPERTIES</b>		Optimal mineral-organic nutrient medium and soil selection for microorganism detection on Mars
Animal urinary bladder mechanical properties from controlled stretch tests, identifying viscoelastic, plastoelastic and creep elements	A71-30566	A71-28681
<b>MEDICAL SCIENCE</b>		Visible and UV photometric recording of microorganism reproduction in liquid medium for application to Mars extraterrestrial life
Development of clinical pathology procedures for detection of diseases in germfree mice and detection of titanium in lymphoid structures of hamsters, mice, and rats [NASA-CR-118671]	N71-26399	A71-28682
<b>MEDICAL SERVICES</b>		Simple organisms resistance and adaptation to low pressure, anoxia, intense cooling, UV irradiation and Mars conditions
Functions of medical services charged with ensuring flying personnel fitness, stressing aging process	A71-28487	A71-28687
<b>MEMORY</b>		Xerophyte soil microorganisms reproductive stability in artificial Mars environment chamber at maximum hygroscopic moisture
Eye movements and visual perception, describing scan path for memory traces	A71-29801	A71-28690
<b>MENTAL PERFORMANCE</b>		Extraterrestrial microorganisms penetration into rocks and meteorites under various climate conditions, noting effects of humidity
Human brain subcortical formations slow electrical processes during memory tests	A71-28377	A71-28693
<b>METABOLISM</b>		<b>MICROSCOPY</b>
Long term immersion effects on human water-salt metabolism, noting increased erythrocyte water contents and hematocrit index	A71-28403	Survey and critique of bacterial growth quantitative determination methods including Bacillus coli direct microscopic morphology and growth measurement
Postflight metabolism and renal function of Soyuz 6, 7 and 8 crewmembers, associating weight loss during flight with water and salt discharges	A71-28409	[NASA-TT-R-13652] N71-24584
Food choice, consumption control and metabolism, discussing homeostatic alimentary theories, nerve signals and appetite regulation	A71-28719	<b>MICROWAVES</b>
Metabolic, ventilator and cardiovascular response during free swimming and treadmill walking, relating oxygen consumption to work intensity	A71-29500	Microwave exposure effects or organisms and biological functions responses and thermal stresses as function of specific frequencies, power density and environmental temperature
Automated microbial metabolism life detection experiments for exobiological studies [NASA-CR-118659]	N71-26380	A71-29325
<b>METEORITES</b>		<b>MIDDLE EAR</b>
Extraterrestrial microorganisms penetration into rocks and meteorites under various climate conditions, noting effects of humidity	A71-28693	Direct electrical stimulation of musculus tensor tympani on click elicited responses in cochlea and cochlear nucleus
<b>METEORITIC COMPOSITION</b>		A71-27832
Hydrocarbons, amino acids and large molecule organic compounds formation in chondrite meteorites by abiogenetic reactions	A71-28692	<b>MINIATURE ELECTRONIC EQUIPMENT</b>
<b>METHOXY SYSTEMS</b>		Eight channel micropowered miniature biomedical PAM/FM telemetry system for implantation in research subjects aboard orbiting space station
Biosynthesis control of melatonin and other methoxyindoles in mammalian pineal organ	A71-29631	A71-30930
<b>MICE</b>		<b>MITOSIS</b>
Fighting between male mice isolated at early age or reared in small groups, considering ontogenetic and experimental determinants	A71-28805	Mitotic response to various diets in normal and regenerating rat liver
<b>MICROBIOLOGY</b>		A71-30069
Microbiological respirometer for oxidative metabolism for plants and small animals,		<b>MODULUS OF ELASTICITY</b>
		Bending and torsional oscillations in rectangular specimens of femur and tibia, calculating elastic and shear moduli of compact bone tissues
		A71-28658
		<b>MOLECULAR BIOLOGY</b>
		Deleterious mutations and neutral substitutions, discussing molecular evolution model for DNA and proteins
		A71-29096
		Biochemistry, molecular biology, radiochemistry, meteorology, soil science, and water pollution research and development and environmental engineering [AECL-3728] N71-24889
		<b>MONITORS</b>
		Patient monitoring system design and equipment specifications with physiological response display device and warning system
		[NASA-CK-118645] N71-25942
		<b>MONOCHROMATIC RADIATION</b>
		Human nervous reactions to monochromatic red, yellow green and blue light for optimal color climate in spacecraft cabins
		A71-28411
		<b>MONOCULAR VISION</b>
		Human visual system gate type lateral interaction to luminous intensity, noting visual field response to monocular viewing
		A71-28460
		<b>MORPHOLOGY</b>
		Adrenal medulla biochemistry and morphology,

- discussing epinephrine synthesis control by glucocorticoid hormones A71-30809
- Survey and critique of bacterial growth quantitative determination methods including *Bacillus coli* direct microscopic morphology and growth measurement [NASA-TT-F-13652] N71-24584
- MOTION**  
Visual detection probability for moving target against static target [AD-720800] N71-25849
- MOTION PICTURES**  
Application of cineholomicrography to study of microcirculation hemodynamics and related physiological studies of man and animal [AD-719401] N71-24684
- MOUNTAIN INHABITANTS**  
High altitude residents cardiovascular evaluations, showing right ventricular enlargement and reactive pulmonary hypertension A71-30285
- MULTIPOLES**  
Dipole, quadripole and octapole measurements in isolated beating hearts A71-28150
- MUSCLE RELAXANTS**  
Airway smooth muscle relaxation mechanical consequences concerning lung volumes, airway conductance, isovolume pressure flow, maximum expiratory flow volume and static lung recoil A71-29497
- MUSCLES**  
Xe 133 elimination from anterior tibial muscles in dry and water immersed sitting subjects, discussing effects of air and oxygen breathing A71-29358
- Human physiological responses comparison between work with concentric and eccentric muscle contractions, observing oxygen debt in short term exercise A71-29495
- Surface electromyographic recordings on biceps and peripheral muscles during sustained isometric contractions A71-29499
- Pyruvate and lactate concentrations in muscle tissue and blood at rest and during exercise A71-31136
- MUSCULAR FATIGUE**  
Intense muscular work adaptation in rats, reducing biochemical and adaptive changes and enhancing anabolic processes A71-30552
- MUSCULAR FUNCTION**  
Respiratory responses and hyperventilation mechanism during static muscular work in maximal voluntary contraction, noting chemoreceptor and alarm-defense reaction A71-28436
- Coronary blood flow response to acute and chronic hypoxia, observing vascular smooth muscle relaxation relation to released adenosine A71-30281
- High motor stresses effects on muscle acetylcholine content, cholinesterase activity and localization, solitary contractions fusion and pessimal weakening A71-30553
- MUSCULAR STRENGTH**  
Reduced diaphragmatic muscle tissue resistance in rats during prolonged hypokinesia, showing sorption of basic vital neutral red stain A71-28417
- Horizontal static forces exerted by men standing in common working positions on various surfaces including coefficients of friction between different floor and shoe materials [AD-720252] N71-26196
- Graphical predictions of human strengths for two handed IVA/EVA tasks including effects of differing gravities, populations, and space suit conditions [NASA-CR-115014] N71-26410
- MUSCULOSKELETAL SYSTEM**  
Method and apparatus for applying compressional forces to skeletal structure of subject to simulate force during ambulatory conditions [NASA-CASE-ARC-10100-1] N71-24738
- MUTATIONS**  
Deleterious mutations and neutral substitutions, discussing molecular evolution model for DNA and proteins A71-29096
- MYOCARDIUM**  
Normal myocardium structure and function, discussing cardiac performance and output control A71-27859
- Myocardial hypertrophy, discussing various forms and mechanisms in myocardial fiber growth and eventual failure A71-27863
- Myocardial infarction and coronary heart disease, considering incidence, mortality and preventive measures A71-27867
- Myocardium cells contractile activity control with frequency dependent self regulatory mechanism A71-28383
- Anoxia induced ECG lesion current in conjunction with myocardial phosphorylcreatine collapse, discussing results with air and nitrogen ventilated guinea pigs A71-28506
- Myocardial ischemia and necrosis without major coronary arteries obstruction, investigating possible deranged hemoglobin-oxygen transport A71-30286
- Myocardial ischemia observations, utilizing morphologic and pathophysiologic correlations with cinecoronary arteriography, left ventriculography and hemodynamic examination A71-30287
- N**
- NERVES**  
Acoustic nerve, cochlear nucleus and superior olivary complex central projection, investigating ascending auditory system organization A71-30255
- Existence of electric and magnetic field component associated with transmission of neuronal impulse studied in isolated sciatic nerves of frogs [NASA-CR-118334] N71-25240
- NERVOUS SYSTEM**  
Cardiac output and arterial pressure control in presence or absence of functional nervous system, discussing dog experiments A71-27839
- Human nervous reactions to monochromatic red, yellow green and blue light for optimal color climate in spacecraft cabins A71-28411
- Development of theory of neuromine nets containing recurrent inhibition and analysis of hippocampus model [AD-720815] N71-25840
- NEURAL NETS**  
Grating pattern vision models, examining single neural network and multiple channel stimulus information processing A71-28461
- NEURONS**  
Brain subcortical structure neuronal assemblies impulse activity during sleeping and dreaming in patients treated with implanted electrodes A71-28378
- Visual cortex neurons impulse activity and postsynaptic potential changes due to light stimuli from quasi-intracellular recordings A71-28381
- Humans and animals vestibular stimuli effect on external respiration function and respiration center neuron activity A71-28413
- Mammalian neurons, neuroendocrine transducer /pinealocytes and adrenomedullary chromaffin/ and endocrine cells communication properties, noting signal transmission A71-30180
- Model describing symmetrical information processing along visual pathways of brain [NASA-CR-118517] N71-26204
- NEUROPHYSIOLOGY**  
Natural sleep and wakefulness stages

neurophysiology based on bioelectric activity spectral and correlation analyses	A71-28380	aftereffects, determining mechanism locations for spatial patterns physical and phenomenal properties	A71-28464
<b>NEUTRON IRRADIATION</b> Multiple starlike flashes and short streaks reported by subjects exposed to neutrons under 25 mev, discussing interaction with retinal rods by proton recoils	A71-29353	Rotation perception in dark and oculogravitational illusion, using power law to describe subjective vestibular sensation relation to angular acceleration stimulus pulses	A71-29327
<b>NEUTRONS</b> Human tissues neutron induced physical doses calculation	A71-29260	<b>OCULOMOTOR NERVES</b> Cat single optic nerve fibers receptive field, observing functional organization and conduction velocity	A71-28458
<b>NIGHT VISION</b> Night vision and dark adaptation of eye, noting sunlight effects on visual acuity	A71-28392	Cat type I and II optic nerve fibers response to flicker stimulation, noting receptive field organization, conduction velocity and temporal and spatial information processing	A71-28459
<b>NITROGEN</b> Ar, N and Ne partial pressure tolerance in dogs, plotting saturation curves	A71-28038	Grating pattern vision models, examining single neural network and multiple channel stimulus information processing	A71-28461
<b>NOISE (SOUND)</b> Noise exposure index from mean sound intensity measurement, considering harmful effects on humans	A71-29284	<b>ODORS</b> Temperature, odor mixing and stimulation frequency effects on olfactory receptor potential of fly <i>Lucilia sericata</i>	A71-30568
Noise hazard guide including damage risk criteria for steady state and impulse or gunfire noise	N71-25559	<b>OLFACATORY PERCEPTION</b> Human odorant evoked response, considering stimulation of olfactory receptors and trigeminal afferences in nose	A71-28891
Numerical analysis of loudness, loudness level, and sound-pressure level of pure tones of steady noise that does not exceed critical bandwidth [NASA-TM-X-2298]	N71-25789	Temperature, odor mixing and stimulation frequency effects on olfactory receptor potential of fly <i>Lucilia sericata</i>	A71-30568
<b>NOISE REDUCTION</b> Earmuff hearing protectors evaluation for attenuation of narrow band noise on experienced subjects	A71-30196	Fly <i>Lucilia sericata</i> olfactory receptor and unit action potentials response to odor stimulation by homologous compounds	A71-30569
Weighting method for aircraft auditory risk limits when wearing ear protectors	N71-25086	<b>ON-LINE PROGRAMMING</b> Automation in cardiology, discussing analog and digital computer techniques for on-line hemodynamic analysis and collection and manipulation of cardiovascular data	A71-27868
[AD-719861]		Hybrid computer program for data reduction or on-line analysis of nystagmus during closed loop experiment involving visual and/or vestibular function	A71-29359
<b>NOISE TOLERANCE</b> Noise hazard guide including damage risk criteria for steady state and impulse or gunfire noise	N71-25559	<b>OPERATOR PERFORMANCE</b> Sensomotor activity tests of operator perceiving high speed stimuli in broad visual field for psychological selection of aircraft and spacecraft pilots	A71-28416
<b>NOMENCLATURES</b> Human factors engineering manual including mathematical formulas, nomographs, conversion tables, units of measurement, and nomenclatures [NASA-CR-114272]	N71-25943	<b>OPERATORS (PERSONNEL)</b> Physiological and biochemical measurements of air traffic controller personnel at O'Hare Airport to determine effects of duties	N71-24747
<b>NONFLAMMABLE MATERIALS</b> Gas composition, electrical ignition hazards, and combustion products from fire resistant material in diving atmospheres	N71-25925	<b>OPHTHALMOLOGY</b> Stereophotogrammetric methods and instruments for studying eye anatomical-optical apparatus and pathological changes	A71-28012
[AD-720352]		<b>OPTICAL CORRECTION PROCEDURE</b> Eye accommodation range limiting for increased adjustment accuracy of optico-mechanical instruments, considering spectacle lens, telescope, magnifying glass and microscope	A71-30416
<b>NOREPINEPHRINE</b> Monoamine oxidase inhibitors and norepinephrine decrease by reserpine affecting brain amines in altitude exposed rats	N71-25957	<b>OPTICAL EQUIPMENT</b> Eye accommodation range limiting for increased adjustment accuracy of optico-mechanical instruments, considering spectacle lens, telescope, magnifying glass and microscope	A71-30416
[AD-720808]		Picture processing and image evaluation [FOA-2-C-2354-72]	N71-26597
<b>NOSE (ANATOMY)</b> Human odorant evoked response, considering stimulation of olfactory receptors and trigeminal afferences in nose	A71-28891	<b>OPTICAL FILTERS</b> Biological tests of laser protective filters for eye as function of optical density and wavelength by sensitivity of in vivo ocular tissue response	A71-29035
<b>NUTRIENTS</b> Optimal mineral-organic nutrient medium and soil selection for microorganism detection on Mars	A71-28681		
<b>NUTRITIONAL REQUIREMENTS</b> Nutritional requirements of aquanauts under open underwater stations and weightlessness	N71-26622		
[JPRS-53161]			
<b>NYSTAGMUS</b> Hybrid computer program for data reduction or on-line analysis of nystagmus during closed loop experiment involving visual and/or vestibular function	A71-29359		
Mathematical model for short term adaptation to vestibular stimuli, deriving transfer function relating angular velocities of nystagmus and head rotation	A71-30250		
<b>OCULOGRAPHIC ILLUSIONS</b> Human visual geometrical illusions and figural			

**OPTICS**

Optical effects observation by air traveler during takeoff, including haze or cloud droplet scattering, halos, shock wave shadows, shallow watercolorots and twilight wedge

A71-29350

**OPTIMAL CONTROL**

Respiratory air flow optimal regulation hypothesis, testing analytic prediction model results with experiment under stress and rest conditions

A71-29491

**OPTIMIZATION**

Optimization of time intervals of conveyor harvestings and harvested age of oxygen producing plants for life support system

A71-28406

**ORBITAL SPACE STATIONS**

Eight channel micropowered miniature biomedical PAM/FM telemetry system for implantation in research subjects aboard orbiting space station

A71-30930

**ORGANIC COMPOUNDS**

Hydrocarbons, amino acids and large molecule organic compounds formation in chondrite meteorites by abiogenetic reactions

A71-28692

**OXYGEN**

Functional-biochemical shifts in rats central nervous system during initial stage of increased oxygen pressure exposure

A71-27810

Initial evaluation of revised helium-oxygen decompression tables  
[AD-719388]

N71-24683

**OXYGEN BREATHING**

Pulmonary oxygen toxicity, considering composition of endobronchial saline extracts of rats and edema development

A71-29362

Pulmonary oxygen toxicity development rate and effects on lung volume and alveolar-arterial gas exchange during oxygen breathing

A71-29501

Quantitative analysis of gamma aminobutyric acid in brain after locomotion and pure oxygen breathing  
[DLR-FB-71-03]

N71-24456

**OXYGEN CONSUMPTION**

Equipment for prolonged measurement of oxygen consumption, respiratory quotient and insensitive perspiration in man, noting cost reduction and operation simplification

A71-29316

Oxygen dissociation curve shift, hemoglobin affinity and diphosphoglycerate concentration in blood of acidotic and normal subjects at altitude

A71-29494

Human physiological responses comparison between work with concentric and eccentric muscle contractions, observing oxygen debt in short term exercise

A71-29495

Trained college and recreational swimmers cardiac output and maximum oxygen consumption during tethered swimming and treadmill running

A71-29496

Metabolic, ventilator and cardiovascular response during free swimming and treadmill walking, relating oxygen consumption to work intensity

A71-29500

**OXYGEN MASKS**

Evaluation procedures for oxygen and protective aviation masks  
[AD-719105]

N71-24411

**OXYGEN METABOLISM**

High altitude aerobic working capacity limitations, examining oxygen transport system and circulator factors

A71-30276

High altitude acclimatized humans, noting decreased coronary blood flow and increased oxygen extraction

A71-30283

Human hypoxic ventilatory drive data for high altitude breathing, noting motivation reduction inversely related to time and altitude

A71-30288

Microbiological respirometer for oxidative metabolism for plants and small animals, considering manned space flight applications

A71-30344

**OXYGEN PRODUCTION**

Optimization of time intervals of conveyor harvestings and harvested age of oxygen producing plants for life support system

A71-28406

Hydrostatic pressure effects on photosynthesis, growth, and oxygen production of algal cultures [AD-720401]

N71-25867

Mathematical model for computerized evaluation of Sabatier reaction kinetics in oxygen recovery from carbon dioxide [NASA-CR-115026]

N71-26295

**OXYGEN TENSION**

Spleen role as erythrocytic depot in reticulocytic reaction to acute hypoxia in splenectomized dogs inhaling air with reduced partial oxygen pressure

A71-28418

Oxygen exposure effect on food consumption/utilization efficiency, growth and biochemical parameters

A71-29360

Lung diffusing capacity for oxygen during exercise and alveolar hypoxia measured without blood samples by ear oximeter

A71-29492

High altitude pulmonary edema syndrome, investigating increased alveolar-arterial oxygen gradients of humans during treadmill exercise

A71-30279

Chronic hypoxia effects on blood oxygen and carbon dioxide tensions and pH changes in unanesthetized chickens at high altitude compared to sea level control

A71-30565

**OXYGENATION**

Proton release association with whole blood oxygenation at constant plasma pH and carbon dioxide partial pressure, using alkaline titration

A71-28433

**OXYHEMOGLOBIN**

Myocardial ischemia and necrosis without major coronary arteries obstruction, investigating possible deranged hemoglobin-oxygen transport

A71-30286

**P****PAINTS**

Aircraft personnel radiation hazards from radioactive luminous paint on instrument dials, signs and operational elements

A71-29145

**PARANASAL SINUSES**

Roentgenological analysis of paranasal sinuses in civil aviators, studying facial cavities infection

A71-29367

**PARTIAL PRESSURE**

Ar, N and Ne partial pressure tolerance in dogs, plotting saturation curves

A71-28038

Alveolar and arterial carbon dioxide partial pressure during rebreathing experiments at rest

A71-28435

**PATHOGENESIS**

Intrinsic factors in pathogenesis of congenital heart diseases, considering morphogenetic processes in heart and great vessels development

A71-27811

**PATHOLOGICAL EFFECTS**

Stereophotogrammetric methods and instruments for studying eye anatomical-optical apparatus and pathological changes

A71-28012

**PATHOLOGY**

Development of clinical pathology procedures for detection of diseases in germfree mice and detection of titanium in lymphoid structures of hamsters, mice, and rats [NASA-CR-118671]

N71-26399

**PATIENTS**

Patient monitoring system design and equipment specifications with physiological response

- display device and warning system  
[NASA-CR-118645] N71-25942
- PATTERN RECOGNITION**
- Grating pattern vision models, examining single neural network and multiple channel stimulus information processing A71-28461
  - Spatio-temporal patterns in visual contrast sensitivity, noting exaggerated eye movements effects A71-28462
  - Behavioral effects of electrically induced EEG abnormalities in inferotemporal and occipital cortex in monkeys on visual pattern discrimination and successive spatial reversals A71-28806
  - Visual evoked cortical response in man related to rate, spatial frequency and wavelength of alternating barred pattern with background illumination A71-28888
  - Intramodal and crossmodal sensory transfer of visual and auditory temporal patterns in normal young adults A71-29326
  - Multiclass pattern recognition in unstructured situations using a set of discriminant functions which partition feature space into regions [AD-720812] N71-25841
  - Summary and coordination of several digital computer algorithms for information compression, structure analysis, and decision making [AD-720811] N71-25842
  - Bayesian decision making and learning in parametric pattern recognition problem for continuous-time Markov process [AD-720810] N71-25847
  - Bayesian algorithms for Markov chain pattern recognition problems [AD-720837] N71-25850
  - Computer modeling of hippocampus and studies involving pattern recognition and information compression [AD-720816] N71-25864
- PEPSIN**
- Immunochemical investigation of dogfish pepsinogens A, C and D, determining characteristics in terms of immunodiffusion, immuno-electrophoresis, complement fixation and enzymic activity inhibition A71-29480
- PERFORMANCE PREDICTION**
- Quantitative performance evaluation of man machine systems in stochastic environments, deriving simulation algorithm A71-29286
- PERFORMANCE TESTS**
- Zero gravity clothes washer utilizing principles of fluidics to provide washing action and reduction in number of components scale model [NASA-CR-114983] N71-24455
  - Spatial processing characteristics in perception of brief visual arrays [AD-719797] N71-25623
  - Zero-gravity absorption refrigeration system design and performance testing for space station environmental control application [NASA-CR-103114] N71-26390
- PERSONNEL DEVELOPMENT**
- Personnel training in airline operations technology at Friedrich List Transportation Institute for aircraft pilots, flight safety engineers and systems engineers A71-29143
- PERSPIRATION**
- Equipment for prolonged measurement of oxygen consumption, respiratory quotient and insensitive perspiration in man, noting cost reduction and operation simplification A71-29316
  - Heat acclimatization effects on sweat Na concentration over wide sweat rates range, discussing possible mechanisms A71-29498
  - Carbon dioxide elimination across human skin, investigating perspiration effects A71-30567
- PH**
- Proton release association with whole blood
- oxygenation at constant plasma pH and carbon dioxide partial pressure, using alkaline titration A71-28433
- Respiratory acid-base disturbances, studying deviations of bicarbonate ion vs pH pathway followed by buffered solution on carbon dioxide titration A71-28434
- Oxygen dissociation curve shift, hemoglobin affinity and diphosphoglycerate concentration in blood of acidotic and normal subjects at altitude A71-29494
- PH FACTOR**
- Chronic hypoxia effects on blood oxygen and carbon dioxide tensions and pH changes in unanesthetized chickens at high altitude compared to sea level control A71-30565
- PHONOCARDIOGRAPHY**
- Phonocardiogram simulator producing electrical voltage waves to control amplitude and duration between simulated sounds [NASA-CASE-XKS-10804] N71-24606
- PHOTOGRAMMETRY**
- Stereophotogrammetric methods and instruments for studying eye anatomical-optical apparatus and pathological changes A71-28012
- PHOTOGRAPHIC RECORDING**
- Automated data acquisition and analysis during cardiac catheterization, using photokymographic and analog magnetic tape recording system in conjunction with digital computer A71-29003
- PHOTOSENSITIVITY**
- Thyroidectomized vitamin A deficient rats, noting visual sensitivity loss not correlated to thyroid A71-28455
  - Small spotted dogfish shark epiphysis cerebri, determining light sensitivity and properties A71-28456
  - Dark adapted albino rats behavioral assessment, measuring absolute visual thresholds to white and colored light A71-28457
  - Spatio-temporal patterns in visual contrast sensitivity, noting exaggerated eye movements effects A71-28462
- PHOTOSYNTHESIS**
- Autotropic cultivation of cereals with high photosynthetic activity under intensive illumination as biological components in life support systems A71-28405
  - Regeneration of spacecraft cabin atmospheres utilizing photosynthesis of unicellular algae [AD-719831] N71-25099
  - Hydrostatic pressure effects on photosynthesis, growth, and oxygen production of algal cultures [AD-720401] N71-25867
- PHYSICAL EXERCISE**
- Sitting and supine position effect on exercise tolerance, heart rate, systolic pressure and respiration rate in male subjects with coronary insufficiency, noting onset of angina pectoris A71-29303
  - Diastolic and mean blood pressure responses to exercise after beta-adrenergic blockade in normal and labile hypertensive subjects, using Trasicor A71-29320
  - Position, exercise and lung volume effects on healthy males pulmonary diffusing capacity for CO at rest and during exercise A71-29493
  - Human physiological responses comparison between work with concentric and eccentric muscle contractions, observing oxygen debt in short term exercise A71-29495
  - Trained college and recreational swimmers cardiac output and maximum oxygen consumption during tethered swimming and treadmill running A71-29496

Pyruvate and lactate concentrations in muscle tissue and blood at rest and during exercise	A71-31136	A71-28414
<b>PHYSICAL FITNESS</b>		
Quick-check audiometry reliability for testing hearing ability according to fitness regulations, comparing to complete tone and speech audiometry	A71-29821	A71-28459
<b>PHYSICAL WORK</b>		
Respiratory responses and hyperventilation mechanism during static muscular work in maximal voluntary contraction, noting chemoreceptor and alarm-defense reaction	A71-28436	A71-28460
Human physiological responses comparison between work with concentric and eccentric muscle contractions, observing oxygen debt in short term exercise	A71-29495	A71-28461
High altitude aerobic working capacity limitations, examining oxygen transport system and circulator factors	A71-30276	A71-28672
Intense muscular work adaptation in rats, reducing biochemical and adaptive changes and enhancing anabolic processes	A71-30552	A71-29314
Annotated bibliography on human acclimation and acclimatization to heat [NASA-TM-X-62008]	N71-25393	A71-29325
<b>PHYSIOLOGICAL EFFECTS</b>		
Human blood cholinergic complex during various physiological states, noting nonmediator action of acetylcholine	A71-28384	A71-29364
Ionized air exposure effects on acetylcholine content and cholinesterase activity in mice, noting cholinergic and serotonergic interaction	A71-28404	A71-29493
Large subsonic jet aircraft civil pilots performance under physiological and psychological stresses induced during severe atmospheric turbulence	A71-29783	A71-29495
Skin temperature sensitivity factors, discussing neural correlates of thermal sensation and skin receptors causing thermal stimulation sensitivity	A71-30253	A71-29497
Endolymph and perilymph fluid systems pathophysiology from induced and spontaneous disorders changes observed in inner ear	A71-30254	A71-29498
Relationship between air blast injury and impairment of pulmonary function in dogs and sheep [AD-709972]	N71-26302	A71-29499
<b>PHYSIOLOGICAL FACTORS</b>		
Human factors engineering data for equipment design including anthropometry, environmental conditions, and physiological and behavioral factors [NASA-CR-114271]	N71-25944	A71-25000
<b>PHYSIOLOGICAL RESPONSES</b>		
Direct electrical stimulation of musculus tensor tympani on click elicited responses in cochlea and cochlear nucleus	A71-27832	A71-25942
Somatosensory cortical and cuneate evoked responses and EEG amplitude/frequency changes due to hypovolemic shock	A71-27836	A71-28150
Ventricular septal defect, discussing incidence, human physiological responses, morbidity and mortality in various age groups	A71-27862	A71-24454
Diurnal rhythms of human physiological functions and performance during frequently alternating sleep-work cycles	A71-28410	A71-25146
Exhaled air microimpurities composition of humans exposed to stress effects including bed rest, starvation, lyophilized diet feeding, high temperature and humidity	A71-28412	A71-29943
Somatic and autonomic responses in vestibular tolerance of human subjects, using Coriolis acceleration test	A71-30251	

Annotated bibliography of translations of foreign language articles on aviation medicine, vestibular function, body temperature, and physiological effects [FIA-AM-71-5]	N71-24745	[ NASA-CR-118629 ] PLANTS (BOTANY)	N71-25715	
Effect of weightlessness on cardiovascular and uretic functions in human subjects [AD-719790]	N71-24997	Optimization of time intervals of conveyor harvestings and harvested age of oxygen producing plants for life support system	A71-28406	
PIGEONS		Circadian rhythm of leaves of Phaseolus angularis plants in controlled carbon dioxide and humidity environment	A71-29475	
Pigeon vestibular apparatus fluids and structures physical properties, detailing specific gravity and viscosity of endolymph, perilymph and cupula	A71-30467	Endogenous short period rhythms in rotational movements of unifoliate leaves of Phaseolus angularis Wight grown under controlled environmental conditions	A71-29476	
PILOT PERFORMANCE		POLARIZATION (CHARGE SEPARATION)	N71-26245	
V/STOL and supersonic commercial aircraft developments, comparing man and machine performance as information processing systems for aircraft control and navigation	A71-28486	Polarization and energy conversion efficiency of yeast and Bacillus lactate fermentation for biochemical fuel cells	A71-29476	
Functional diagnostics in aerospace medicine for evaluating pilot ability and flight stresses	A71-28488	POLYCYTHEMIA	A71-30289	
Toxicological evaluation of CO in humans and other mammals, considering pilot performance prediction for aircraft environment	A71-28902	Ventilatory control in acute hypoxia, detailing polycythemia effects on respiratory chemoreceptor sensitivity	A71-29475	
Case histories of pilot failure during training or operational flight due to cerebral cortical dysfunction	A71-29365	PORPHYRINS	A71-28684	
Atmospheric turbulence induced aircraft vibrations effects on aircrew performance, discussing physiological and psychological responses	A71-29778	Biochemical luminescence reaction for ferro-porphyrin proteins determination in extraterrestrial life detection	A71-27833	
Low altitude turbulence simulation in piloted flight simulators, discussing turbulence induced aircraft disturbances and effects on pilot	A71-29781	POSTURE		
Large subsonic jet aircraft civil pilots performance under physiological and psychological stresses induced during severe atmospheric turbulence	A71-29783	Joint action of various afferents in regulation of human posture, considering appropriate differential reactions	N71-24412	
Linear transfer function for describing human response to aircraft control	N71-24710	POTABLE WATER		
Model for task interference with pilot performance in multivariable manual control systems [NASA-CR-1746]	N71-26160	Radioisotope fueled distillation system for reclaiming potable water from urine on prolonged space flight	A71-29113	
PILOT SELECTION		[AD-718965]	POTASSIUM OXIDES	N71-24412
Sensomotor activity tests of operator perceiving high speed stimuli in broad visual field for psychological selection of aircraft and spacecraft pilots	A71-28416	Respiratory gas reaction mechanism on potassium superoxide in closed circuit breathing apparatus	A71-28893	
PILOT TRAINING		POTENTIAL FIELDS		
Jet pilots training technologies, discussing multimedia instruction, psychological stress reduction, self study, airborne video application and simulation [SAE PAPER 710477]	A71-28342	Distinctive visual evoked response potential field patterns resulting from human retina stimulation, using electrode array on occipital scalp	A71-28893	
Airline pilot training specific behavioral objective concept, noting introduction with Boeing 744 [SAE PAPER 710479]	A71-28344	PRESSURE CHAMBERS		
Flight training program for twin-engine transition, using commercially available training device [SAE PAPER 710480]	A71-28345	Gas composition, electrical ignition hazards, and combustion products from fire resistant material in diving atmospheres [AD-720352]	N71-25925	
Head- or helmet-mounted display/control system in V/STOL aircraft for pilot workload and training reduction [AHS PREPRINT 532]	A71-31093	PRESSURE EFFECTS		
Analysis of pilot training, career, education, and motivation related to role of research and flight simulators [AD-720797]	N71-25792	Abdominal pressure decrease resulting in transpulmonary pressure crano-caudal gradient increase under gravitational effect simulation	A71-28437	
PINEAL GLAND		Systemic arterial blood pressure response to chronic high altitude and hypoxia effects	A71-30280	
Small spotted dogfish shark epiphysis cerebri, determining light sensitivity and properties	A71-28456	Effects of atmospheric gas and moisture concentration, temperature, pressure, and wind velocity on human performance and skin water loss rate [NASA-CR-115024]	N71-26385	
Biosynthesis control of melatonin and other methoxyindoles in mammalian pineal organ	A71-29631	PRESSURE MEASUREMENTS		
PLANETARY ENVIRONMENTS		Mechanical sterilization and cleansing of Goldmann applanation tonometer prisms contaminated with coliphage, comparing with germicidal immersion	A71-29036	
Examination of data to be obtained by Mariner Mars 1971 infrared interferometer spectrometer experiment for inferential information on Mars surface biota		PRESSURE PULSES		
		Baroreflex regulation of pulse interval during bicycling exercise, using systolic pressure-pulse relation to express reflex sensitivity	A71-28951	
		PRESSURE SUITS		
		Cord restraint system for pressure suit joints [NASA-CASE-XMS-9635]	N71-24623	
		Development of improved convolute section for pressurized suits to provide high degree of mobility in response to minimum of applied torque [NASA-CASE-XMS-09637-1]	N71-24730	
		Design and development of pressurized suit with improved air retention and restraint coverall		

## PRISMS

## SUBJECT INDEX

- with passive ventilation, maximum mobility, and long term unpressurized comfort [AD-720827] N71-25863
- PRISMS**  
Mechanical sterilization and cleansing of Goldmann appplanation tonometer prisms contaminated with coliphage, comparing with germicidal immersion A71-29036
- PRODUCTION ENGINEERING**  
Human position in socialist productive system, examining pedagogical aspects of leadership A71-28491
- PROTECTIVE CLOTHING**  
Astronaut protection from solar flare high energy protons, discussing spacesuit, spacecraft orientation and solid, electrostatic, magnetic and plasma shielding A71-29252
- Evaluation of protective clothing for flight crew members [AD-719106] N71-24460
- Development of improved convolute section for pressurized suits to provide high degree of mobility in response to minimum of applied torque [NASA-CASE-XMS-09637-1] N71-24730
- PROTEINS**  
Lipid, protein and carbohydrate concentrations in Chlorella biomass from pyrolysis and aluminogel column chromatography A71-28407
- Biochemical luminescence reaction for ferroporphyrin proteins determination in extraterrestrial life detection A71-28684
- Mars physical conditions compared to earth, simulating Martian conditions and low temperature and UV effects on proteins A71-28688
- Deleterious mutations and neutral substitutions, discussing molecular evolution model for DNA and proteins A71-29096
- PROTONS**  
Proton release association with whole blood oxygenation at constant plasma pH and carbon dioxide partial pressure, using alkaline titration A71-28433
- PROTOZOA**  
Hypoxia effects on organism resistance and immunobiological reactivity, noting bacterial and protozoa infections aggravation A71-28401
- PSYCHOLOGICAL EFFECTS**  
Psychobiological effects of prolonged bed rest in young healthy volunteers from EEG recording, psychological testing and psychomotor performance A71-29363
- Large subsonic jet aircraft civil pilots performance under physiological and psychological stresses induced during severe atmospheric turbulence A71-29783
- PSYCHOLOGICAL TESTS**  
Sensomotor activity tests of operator perceiving high speed stimuli in broad visual field for psychological selection of aircraft and spacecraft pilots A71-28416
- PSYCHOMOTOR PERFORMANCE**  
Psychobiological effects of prolonged bed rest in young healthy volunteers from EEG recording, psychological testing and psychomotor performance A71-29363
- Vibration effects on visual discrimination and tracking abilities in humans [AD-719745] N71-24437
- Tracking error frequency response function and human psychomotor performance under aircraft vertical and lateral vibration conditions [AD-719754] N71-25087
- PULMONARY CIRCULATION**  
Pulmonary circulation regulating factors, examining heart disease effects on lung capillary blood flow A71-27861
- High altitude pulmonary edema in unacclimatized humans, discussing symptoms, etiology incidence and prevention A71-30277
- High altitude blood coagulation, determining hypercoagulability relationship to altered pulmonary hemodynamics A71-30278
- High altitude pulmonary edema syndrome, investigating increased alveolar-arterial oxygen gradients of humans during treadmill exercise A71-30279
- High altitude residents cardiovascular evaluations, showing right ventricular enlargement and reactive pulmonary hypertension A71-30285
- Vago sympathetic nerve trunk stimulation effects on pulmonary blood volume changes magnitudes and pattern in isolated perfused lungs A71-31135
- PULMONARY FUNCTIONS**  
Abdominal pressure decrease resulting in transpulmonary pressure crano-caudal gradient increase under gravitational effect simulation A71-28437
- Pulmonary oxygen toxicity, considering composition of endobronchial saline extracts of rats and edema development A71-29362
- Lung diffusing capacity for oxygen during exercise and alveolar hypoxia measured without blood samples by ear oximeter A71-29492
- Position, exercise and lung volume effects on healthy males pulmonary diffusing capacity for CO at rest and during exercise A71-29493
- Airway smooth muscle relaxation mechanical consequences concerning lung volumes, airway conductance, isovolume pressure flow, maximum expiratory flow volume and static lung recoil A71-29497
- Pulmonary oxygen toxicity development rate and effects on lung volume and alveolar-arterial gas exchange during oxygen breathing A71-29501
- Human hypoxic ventilatory drive data for high altitude breathing, noting motivation reduction inversely related to time and altitude A71-30288
- Ventilatory control in acute hypoxia, detailing polycythemia effects on respiratory chemoreceptor sensitivity A71-30289
- PULSE AMPLITUDE MODULATION**  
Eight channel micropowered miniature biomedical PAM/FM telemetry system for implantation in research subjects aboard orbiting space station A71-30930
- PULSE COMPRESSION**  
Analog simulation of peripheral, ascending, and central auditory perception mechanisms and bandwidth compression relationships to speech recognition [AD-720246] N71-26261
- PULSE FREQUENCY MODULATION TELEMETRY**  
Eight channel micropowered miniature biomedical PAM/FM telemetry system for implantation in research subjects aboard orbiting space station A71-30930
- PUPIL SIZE**  
Pupil size effect on dynamics of pupillary movements, considering reactions to light and darkness A71-29032
- Pupil size influence on surface area and radius of inner /pupillary/ and outer /ciliary/ iris ring A71-29034
- PUPILLOMETRY**  
Human afterimage and pupillary activity in darkness after strong light exposure, noting dependence on stimulus intensity and duration A71-28463
- Pupil size influence on surface area and radius of inner /pupillary/ and outer /ciliary/ iris ring A71-29034
- PYRIDOXINE**  
Dietary pyridoxal deficiency causing amino acid content reduction in liver, kidney, brain and

heart tissues	A71-27837	A71-28510
<b>PYRUVATES</b>		
Pyruvate and lactate concentrations in muscle tissue and blood at rest and during exercise	A71-31136	A71-29031
<b>Q</b>		
<b>QUADRUPOLES</b>		
Dipole, quadripole and octapole measurements in isolated beating hearts	A71-28150	A71-29367
<b>QUANTITATIVE ANALYSIS</b>		
Quantitative analysis of gamma aminobutyric acid in brain after locomotion and pure oxygen breathing [DLR-FB-71-03]	N71-24456	A71-29319
<b>R</b>		
<b>RABBITS</b>		
Artificial changes in leukocyte count of rabbits [NASA-TT-F-13628]	N71-24737	A71-28455
<b>RADIATION DOSAGE</b>		
Human tissues neutron induced physical doses calculation	A71-29260	N71-24553
<b>RADIATION EFFECTS</b>		
Soviet book on vestibular reactions covering functional relationship between stimulus parameters and labyrinth nonauditory part, adaptation to Coriolis forces and response to ionizing radiation	A71-28672	A71-29113
Mars physical conditions compared to earth, simulating Martian conditions and low temperature and UV effects on proteins	A71-28688	N71-26295
Microwave exposure effects on organisms and biological functions responses and thermal stresses as function of specific frequencies, power density and environmental temperature	A71-29325	REACTION KINETICS
Multiple starlike flashes and short streaks reported by subjects exposed to neutrons under 25 mev, discussing interaction with retinal rods by proton recoils	A71-29353	Respiratory gas reaction mechanism on potassium superoxide in closed circuit breathing apparatus
Electromagnetic field action on living organism simulated with infinite homogeneous cylinder in infinite cylindrical solenoid EM media	A71-30026	A71-29345
<b>RADIATION HAZARDS</b>		
Biological tests of laser protective filters for eye as function of optical density and wavelength by sensitivity of in vivo ocular tissue response	A71-29035	Vibration effects on visual discrimination and tracking abilities in humans
Aircraft personnel radiation hazards from radioactive luminous paint on instrument dials, signs and operational elements	A71-29145	[AD-719745]
<b>RADIATION THERAPY</b>		
Measurement of oxygen effect and biological effectiveness of 910 MeV helium ion beam using cultured human kidney cells of interest in radiotherapeutic treatment of hypoxic tumors [UCRL-20190]	N71-25241	REAL TIME OPERATION
<b>RADIO DIRECTION FINDERS</b>		
Voice communication, direction finding, and radio homing equipment development for search and rescue by air [AD-715310]	N71-24414	Evoked brain potentials averaging in real time with computer linked by long distance communication lines
<b>RADIOACTIVE MATERIALS</b>		
Aircraft personnel radiation hazards from radioactive luminous paint on instrument dials, signs and operational elements	A71-29145	A71-28385
<b>RADIOCHEMISTRY</b>		
Biochemistry, molecular biology, radiochemistry, meteorology, soil science, and water pollution research and development and environmental engineering [AECL-3728]	N71-24889	REBREATHING
<b>RADIOGRAPHY</b>		
Spinal column radiographic examination after pilot ejection, discussing vertebral injuries detection		Alveolar and arterial carbon dioxide partial pressure during rebreathing experiments at rest
		A71-28435
<b>REFLEXES</b>		
Baroreflex regulation of pulse interval during bicycling exercise, using systolic pressure-pulse relation to express reflex sensitivity		A71-28889
<b>RECORDING INSTRUMENTS</b>		
Compact head mounted six channel IC telemeter for artifact free EEG recording during laughter		A71-28951

<b>REFRIGERATING MACHINERY</b>	A71-29113
Zero-gravity absorption refrigeration system design and performance testing for space station environmental control application [NASA-CR-103114]	N71-26390
<b>REGENERATION (ENGINEERING)</b>	A71-29491
Regeneration of spacecraft cabin atmospheres utilizing photosynthesis of unicellular algae [AD-719831]	N71-25099
Control analysis of regenerative spacecraft cabin atmosphere system for earth orbiting manned missions of up to 1 year duration [NASA-TN-D-6139]	N71-26019
<b>REGENERATION (PHYSIOLOGY)</b>	A71-30411
Mitotic response to various diets in normal and regenerating rat liver	A71-30069
<b>RELIABILITY ANALYSIS</b>	A71-30412
Aircraft survival equipment testing including maintainability, systems compatibility, human factors engineering, and reliability of rations, protective clothing, floats, and parachutes [AD-720225]	N71-26138
<b>RENAL FUNCTION</b>	A71-29303
Postflight metabolism and renal function of Soyuz 6, 7 and 8 crewmembers, associating weight loss during flight with water and salt discharges	A71-28409
<b>RESCUE OPERATIONS</b>	A71-29316
Aircraft accident rescue system with helicopters, discussing cooperation between helicopter service and ground personnel	A71-28721
Voice communication, direction finding, and radio homing equipment development for search and rescue by air [AD-715310]	N71-24414
Engine-airframe contribution to combat aircrew rescue simulation [AD-720238]	N71-26371
<b>RESEARCH FACILITIES</b>	A71-29500
Analysis of conduct and effectiveness of biological research projects at military research facility [ORNL-TM-3218]	N71-25551
<b>RESEARCH MANAGEMENT</b>	A71-30288
International control for experimentation with human eggs	N71-24763
<b>RESEARCH PROJECTS</b>	A71-30289
Analysis of conduct and effectiveness of biological research projects at military research facility [ORNL-TM-3218]	N71-25551
Analysis of pilot training, career, education, and motivation related to role of research and flight simulators [AD-720797]	N71-25792
<b>RESERPINE</b>	A71-30276
Monoamine oxidase inhibitors and norepinephrine decrease by reserpine affecting brain amines in altitude exposed rats [AD-720808]	N71-25957
<b>RESPIRATION</b>	A71-30278
Effect of immersion on exchange of oxygen in lung at simulated depth of 5 feet of sea water using hyperbaric chamber [AD-719389]	N71-24682
<b>RESPIRATORY DISEASES</b>	A71-29493
High altitude pulmonary edema in unacclimatized humans, discussing symptoms, etiology incidence and prevention	A71-28803
High altitude pulmonary edema syndrome, investigating increased alveolar-arterial oxygen gradients of humans during treadmill exercise	A71-30277
<b>RESPIRATORY PHYSIOLOGY</b>	A71-28418
Humans and animals vestibular stimuli effect on external respiration function and respiration center neuron activity	A71-28413
Respiratory responses and hyperventilation mechanism during static muscular work in maximal voluntary contraction, noting chemoreceptor and alarm-defense reaction	A71-28436
Respiratory gas reaction mechanism on potassium superoxide in closed circuit breathing apparatus	N71-26204
<b>RESPIRATORY RATE</b>	A71-29491
Sitting and supine position effect on exercise tolerance, heart rate, systolic pressure and respiration rate in male subjects with coronary insufficiency, noting onset of angina pectoris	A71-29303
Equipment for prolonged measurement of oxygen consumption, respiratory quotient and insensitive perspiration in man, noting cost reduction and operation simplification	A71-29316
Respiratory air flow optimal regulation hypothesis, testing analytic prediction model results with experiment under stress and rest conditions	A71-29491
<b>RESPIRATORY REFLEXES</b>	A71-29500
Human hypoxic ventilatory drive data for high altitude breathing, noting motivation reduction inversely related to time and altitude	A71-30288
Ventilatory control in acute hypoxia, detailing polycythemia effects on respiratory chemoreceptor sensitivity	A71-30289
<b>RESPIRATORY SYSTEM</b>	A71-30276
High altitude aerobic working capacity limitations, examining oxygen transport system and circulator factors	A71-30278
High altitude blood coagulation, determining hypercoagulability relationship to altered pulmonary hemodynamics	A71-30278
<b>RESPIROMETERS</b>	A71-30344
Microbiological respirometer for oxidative metabolism for plants and small animals, considering manned space flight applications	A71-30344
<b>REST</b>	A71-29493
Position, exercise and lung volume effects on healthy males pulmonary diffusing capacity for CO at rest and during exercise	A71-29493
<b>RETENTION (PSYCHOLOGY)</b>	A71-28803
Learning sets development relation to transfer suppression, discussing previously learned discriminations retention	A71-28803
<b>RETICULOCYTES</b>	A71-28418
Spleen role as erythrocytic depot in reticulocytic reaction to acute hypoxia in splenectomized dogs inhaling air with reduced partial oxygen pressure	A71-28418
<b>RETINA</b>	A71-28893
Distinctive visual evoked response potential field patterns resulting from human retina stimulation, using electrode array on occipital scalp	A71-28893
Visual sensation time theory validity investigation, discussing time elapsed between retinal receptor stimulation and perceptory sensation	A71-30406
<b>RETINAL ADAPTATION</b>	A71-30406
Model describing symmetrical information processing along visual pathways of brain [NASA-CR-118517]	N71-26204

- RETINAL IMAGES**  
Visual perception theoretical models for liminal contrast prediction A71-29442
- RETINENE**  
Thyroidectomized vitamin A deficient rats, noting visual sensitivity loss not correlated to thyroid A71-28455
- RHYTHM (BIOLOGY)**  
Endogenous short period rhythms in rotational movements of unifoliate leaves of Phaseolus angularis Wight grown under controlled environmental conditions A71-29476
- Alpha rhythm activity, periodicity and mean frequency in cortex regions of healthy humans based on EEG frequency and correlation analyses A71-30551
- ROCKS**  
Extraterrestrial microorganisms penetration into rocks and meteorites under various climate conditions, noting effects of humidity A71-28693
- RODENTS**  
Adrenocortical function in garden dormouse during autumnal preparation for hibernation, considering environmental temperature factors A71-29315
- ROTATING BODIES**  
Endogenous short period rhythms in rotational movements of unifoliate leaves of Phaseolus angularis Wight grown under controlled environmental conditions A71-29476
- ROTATING ENVIRONMENTS**  
Accelerations effect on receptors in semicircular canals during human movements in rotating environment, using vector analysis A71-28415
- RUNNING**  
Trained college and recreational swimmers cardiac output and maximum oxygen consumption during tethered swimming and treadmill running A71-29496
- S**
- SABATIER REACTION**  
Mathematical model for computerized evaluation of Sabatier reaction kinetics in oxygen recovery from carbon dioxide [NASA-CR-115026] N71-26295
- SAFETY FACTORS**  
Hyperbaric fire safety research, including flame spread rates in helium and nitrogen diving atmospheres and minimum oxygen concentration for combustion in hyperbaric environments [AD-720353] N71-25954
- SCALE MODELS**  
Zero gravity clothes washer utilizing principles of fluidics to provide washing action and reduction in number of components scale model [NASA-CR-114983] N71-24455
- SCIATIC REGION**  
Existence of electric and magnetic field component associated with transmission of neuronal impulse studied in isolated sciatic nerves of frogs [NASA-CR-118334] N71-25240
- SEAMS (JOINTS)**  
Cord restraint system for pressure suit joints [NASA-CASE-XMS-9635] N71-24623
- SELF ORGANIZING SYSTEMS**  
Algorithms of self organization, artificial intelligence, and tree search applied to various practical problems [AD-719930] N71-25652
- SEMICIRCULAR CANALS**  
Accelerations effect on receptors in semicircular canals during human movements in rotating environment, using vector analysis A71-28415
- SENSE ORGANS**  
Skin temperature sensitivity factors, discussing neural correlates of thermal sensation and skin receptors causing thermal stimulation sensitivity A71-30253
- SENSORIMOTOR PERFORMANCE**  
Sensomotor activity tests of operator perceiving high speed stimuli in broad visual field for psychological selection of aircraft and spacecraft pilots A71-28416
- SENSORY DEPRIVATION**  
Luminance and luminous flux discrimination in light and dark reared rats after early visual deprivation A71-28810
- SENSORY PERCEPTION**  
Somatosensory cortical and cuneate evoked responses and EEG amplitude/frequency changes due to hypovolemic shock A71-27836
- Rotation perception in dark and oculogyral illusion, using power law to describe subjective vestibular sensation relation to angular acceleration stimulus pulses A71-29327
- Papers on anatomy and mechanisms of mammalian sensory systems including vision, audition and touch A71-30251
- Sensory modes of flies, bees, and moths applied to target acquisition and tracking [AD-720412] N71-25958
- SENSORY STIMULATION**  
Cat type I and II optic nerve fibers response to flicker stimulation, noting receptive field organization, conduction velocity and temporal and spatial information processing A71-28459
- Evoked cortical responses to taste solutions of acid and salt applied to human tongue surface, using averaging technique A71-28887
- Habituation and dishabituation of human vertex response, using auditory or somatosensory stimuli A71-28890
- Human odorant evoked response, considering stimulation of olfactory receptors and trigeminal afferences in nose A71-28891
- Repetitive stimulation effects on auditory evoked potentials in cochlear nucleus, inferior colliculus and medial geniculate body of unanesthetized cats A71-28892
- Spatial and temporal discrimination functions in vision, audition and touch, establishing and controlling stimuli by vibrators A71-30252
- Temperature, odor mixing and stimulation frequency effects on olfactory receptor potential of fly Lucilia sericata A71-30568
- Fly Lucilia sericata olfactory receptor and unit action potentials response to odor stimulation by homologous compounds A71-30569
- Behavior of living pike fish under influence of electrical and mechanical stimulation of cupula of left horizontal ampulla and semicircular canal [NASA-TT-F-13665] N71-25716
- SEPTUM**  
Ventricular septal defect, discussing incidence, human physiological responses, morbidity and mortality in various age groups A71-27862
- SEQUENCING**  
Monkeys trained to observe and report two-member serial position sequences with delayed matching-to-sample procedure A71-29519
- SEWING**  
Development of improved convolute section for pressurized suits to provide high degree of mobility in response to minimum of applied torque [NASA-CASE-XMS-09637-1] N71-24730
- SHADOWS**  
Optical effects observation by air traveler during takeoff, including haze or cloud droplet scattering, halos, shock wave shadows, shallow watercolors and twilight wedge

SHARKS	A71-29350
Small spotted dogfish shark epiphysis cerebri, determining light sensitivity and properties	A71-28456
SHEAR PROPERTIES	
Bending and torsional oscillations in rectangular specimens of femur and tibia, calculating elastic and shear moduli of compact bone tissues	A71-28658
SHOCK WAVES	
Relationship between air blast injury and impairment of pulmonary function in dogs and sheep	N71-26302
[AD-709972]	
SHOES	
Horizontal static forces exerted by men standing in common working positions on various surfaces including coefficients of friction between different floor and shoe materials	N71-26196
[AD-720252]	
SIGNAL MEASUREMENT	
Isolation technique for recording low level ECG and deep body temperature signals in animals exposed to large amplitude RF fields	A71-28864
SIGNAL TRANSMISSION	
Mammalian neurons, neuroendocrine transducer /pinealocytes and adrenomedullary chromaffin/ and endocrine cells communication properties, noting signal transmission	A71-30180
SILVER ISOTOPES	
Elimination of microbial and viral agents from spacecraft water systems by silver ions from electrolytic ion generator	N71-24436
[NASA-CR-114978]	
SIMULATORS	
Phonocardiogram simulator producing electrical voltage waves to control amplitude and duration between simulated sounds	N71-24606
[NASA-CASE-XKS-10804]	
SITTING POSITION	
Sitting and supine position effect on exercise tolerance, heart rate, systolic pressure and respiration rate in male subjects with coronary insufficiency, noting onset of angina pectoris	A71-29303
Xe 133 elimination from anterior tibial muscles in dry and water immersed sitting subjects, discussing effects of air and oxygen breathing	A71-29358
Vertical translational acceleration perception threshold of aircraft pilot seated in upright position	A71-29780
SKIN (ANATOMY)	
Carbon dioxide elimination across human skin, investigating perspiration effects	A71-30567
Effects of atmospheric gas and moisture concentration, temperature, pressure, and wind velocity on human performance and skin water loss rate	N71-26385
[NASA-CR-115024]	
SKIN RESISTANCE	
Electrocardiography from unprepared skin without paste, using integrated stainless steel electrode- buffer amplifiers	A71-29399
SKIN TEMPERATURE (BIOLOGY)	
Local cutaneous heat regulation in man, using thermoconvective method in analyzing response to constant temperature thermode application to small skin surface	A71-29314
Skin temperature sensitivity factors, discussing neural correlates of thermal sensation and skin receptors causing thermal stimulation sensitivity	A71-30253
Establishment of relationship between skin temperature and ability to tolerate cold and hot environments for human subjects	N71-24748
[FAA-AM-71-4]	
Regional control of skin temperature and heat transfer measurements of various body sections	N71-25953
[AD-720830]	
SLEEP	
Brain subcortical structure neuronal assemblies impulse activity during sleeping and dreaming in patients treated with implanted electrodes	A71-28378
Behavioral arousal and EEG thresholds changes during sleep due to electrical and audio stimulation	A71-28379
Natural sleep and wakefulness stages neurophysiology based on bioelectric activity spectral and correlation analyses	A71-28380
Heart rate variability in REM sleep, stage 4 sleep and wakefull state from ECG of normal males, calculating coefficient of temporal variability for each state	A71-29319
Development of apparatus and method for quantitatively measuring brain activity as automatic indication of sleep state and level of consciousness	N71-24729
[NASA-CASE-MSC-13282-1]	
SOCIAL FACTORS	
Human position in socialist productive system, examining pedagogical aspects of leadership	A71-28491
SOCIAL ISOLATION	
Fighting between male mice isolated at early age or reared in small groups, considering ontogenetic and experiential determinants	A71-28805
SODIUM	
Heat acclimatization effects on sweat Na concentration over wide sweat rates range, discussing possible mechanisms	A71-29498
SODIUM CHLORIDES	
Long term immersion effects on human water-salt metabolism, noting increased erythrocyte water contents and hematocrit index	A71-28403
SOIL SCIENCE	
Optimal mineral-organic nutrient medium and soil selection for microorganism detection on Mars	A71-28681
Biochemistry, molecular biology, radiochemistry, meteorology, soil science, and water pollution research and development and environmental engineering	N71-24889
[AECL-3728]	
Biological and geological aspects of soil science	N71-26456
SOILS	
Kerophyte soil microorganisms reproductive stability in artificial Mars environment chamber at maximum hygroscopic moisture	A71-28690
SOLAR FLARES	
Astronaut protection from solar flare high energy protons, discussing spacesuit, spacecraft orientation and solid, electrostatic, magnetic and plasma shielding	A71-29252
SOLAR RADIATION SHIELDING	
Astronaut protection from solar flare high energy protons, discussing spacesuit, spacecraft orientation and solid, electrostatic, magnetic and plasma shielding	A71-29252
SOUND INTENSITY	
Noise exposure index from mean sound intensity measurement, considering harmful effects on humans	A71-29284
SOYUZ SPACECRAFT	
Postflight metabolism and renal function of Soyuz 6, 7 and 8 crewmembers, associating weight loss during flight with water and salt discharges	A71-28409
SPACE ENVIRONMENT SIMULATION	
Man and equipment instrumentation in simulated space environment, considering training and interface of man and life support systems	A71-30312
SPACE FLIGHT FEEDING	
Compressed, coated, freeze dried, nonsweet, cheese and meat flavored snack cubes for Apollo food system	

[NASA-CR-114996]	N71-25001	Spacecraft sterilization, discussing space environment effects on microorganisms, interplanetary unmanned lander sterilization, crew quarantine, etc
<b>SPACE FLIGHT STRESS</b>		A71-28696
Space flight factors effects on human physiology and psychology, discussing spacecraft gaseous medium control, food supply, closed ecological systems and weightlessness effects	A71-27876	
Postflight metabolism and renal function of Soyuz 6, 7 and 8 crewmembers, associating weight loss during flight with water and salt discharges	A71-28409	
<b>SPACE MAINTENANCE</b>		
Design and tests of astronauts tool kit and tools for in-flight space maintenance	N71-25533	Spatio-temporal patterns in visual contrast sensitivity, noting exaggerated eye movements
[NASA-CR-103135]		A71-28462
<b>SPACE PERCEPTION</b>		
Human visual geometrical illusions and figural aftereffects, determining mechanism locations for spatial patterns physical and phenomenal properties	A71-28464	Spatial processing characteristics in perception of brief visual arrays
Behavioral effects of electrically induced EEG abnormalities in inferotemporal and occipital cortex in monkeys on visual pattern discrimination and successive spatial reversals	A71-28806	[AD-719797] N71-25623
Spatial and temporal discrimination functions in vision, audition and touch, establishing and controlling stimuli by vibrators	A71-30252	<b>SPECTRAL LINE WIDTH</b>
Chemical evolution and extraterrestrial life detection, noting cell proliferation methods, automatic biological stations and Mars microorganisms	A71-28680	Analog simulation of peripheral, ascending, and central auditory perception mechanisms and bandwidth compression relationships to speech recognition
Physiological effects and design criteria for artificial gravity space station	N71-24454	[AD-720246] N71-26261
[NASA-CR-114982]		Analog simulation of peripheral, ascending, and central auditory perception mechanisms and bandwidth compression relationships to speech recognition
Zero-gravity absorption refrigeration system design and performance testing for space station environmental control application	N71-26390	[AD-720246] N71-26261
[NASA-CR-103114]		<b>SPIKE POTENTIALS</b>
<b>SPACE SUITS</b>		Superposition model of spontaneous activity of cerebellar Purkinje cells for spike triggering
Venting device for pressurized space suit helmet to eliminate vomit expelled by crewmen	N71-26333	A71-29298
[NASA-CASE-XMS-09652-1]		<b>SPINE</b>
Design and tests of astronauts tool kit and tools for in-flight space maintenance	N71-25533	Spinal column radiographic examination after pilot ejection, discussing vertebral injuries detection
[NASA-CR-103135]		A71-28510
<b>SPACECRAFT CABIN ATMOSPHERES</b>		<b>SPLEEN</b>
Ion exchange resin carbon dioxide removal and concentration system for space cabin environments, describing monitoring and control instrumentation	A71-30313	Spleen role as erythrocytic depot in reticulocytic reaction to acute hypoxia in splenectomized dogs inhaling air with reduced partial oxygen pressure
Regeneration of spacecraft cabin atmospheres utilizing photosynthesis of unicellular algae	N71-25099	A71-28418
[AD-719831]		<b>SPORES</b>
Control analysis of regenerative spacecraft cabin atmosphere system for earth orbiting manned missions of up to 1 year duration	N71-26019	Stearothermophilus spore germination stimulation, investigating effects of preheating and amino acid and carbohydrate concentration
[NASA-TN-D-6139]		A71-28695
<b>SPACECRAFT DESIGN</b>		<b>SPRAYERS</b>
Physiological effects and design criteria for artificial gravity space station	N71-24454	Adhesive spray process for attaching biomedical skin electrodes
[NASA-CR-114982]		[NASA-CASE-XFR-07658-1] N71-26293
<b>SPACECRAFT ENVIRONMENTS</b>		<b>STEAROTHERMOPHILUS</b>
Human nervous reactions to monochromatic red, yellow green and blue light for optimal color climate in spacecraft cabins	A71-28411	Stearothermophilus spore germination stimulation, investigating effects of preheating and amino acid and carbohydrate concentration
Man and equipment instrumentation in simulated space environment, considering training and interface of man and life support systems	A71-30312	A71-28695
<b>SPACECRAFT INSTRUMENTS</b>		<b>STEREOPHOTOGRAPHY</b>
Soviet papers on extraterrestrial life and detection methods covering biological conditions, extremal environmental factors and spacecraft sterilization	A71-28677	Stereophotogrammetric methods and instruments for studying eye anatomical-optical apparatus and pathological changes
Space objects sterilization techniques in Soviet Union and United States, covering hot air, ionizing radiation, UV light, ethylene oxide with or without Freon, etc	A71-28694	A71-28012
		<b>STERILIZATION</b>
		Mechanical sterilization and cleansing of Goldmann applanation tonometer prisms contaminated with coliphage, comparing with germicidal immersion
		A71-29036
		Elimination of microbial and viral agents from spacecraft water systems by silver ions from electrolytic ion generator
		[NASA-CR-114978] N71-24436
		<b>STOCHASTIC PROCESSES</b>
		Stochastic identification method for transforming ECG and VCG data to approximate diagnosis, using computerized dipole models
		A71-29002
		Quantitative performance evaluation of man machine systems in stochastic environments, deriving simulation algorithm
		A71-29286
		<b>STRESS (PHYSIOLOGY)</b>
		Space flight factors effects on human physiology and psychology, discussing spacecraft gaseous medium control, food supply, closed ecological systems and weightlessness effects
		A71-27876

- Heat acclimatization effects on sweat Na concentration over wide sweat rates range, discussing possible mechanisms A71-29498
- High motor stresses effects on muscle acetylcholine content, cholinesterase activity and localization, solitary contractions fusion and pessimal weakening A71-30553
- Species comparison of cardiac hypertrophy in animals chronically exposed at sea level, 5,380, 11,140, and 14,110 feet [AD-720596] N71-26167
- STRESS (PSYCHOLOGY)**
- Space flight factors effects on human physiology and psychology, discussing spacecraft gaseous medium control, food supply, closed ecological systems and weightlessness effects A71-27876
- STRINGS**
- Cord restraint system for pressure suit joints [NASA-CASE-XMS-9635] N71-24623
- STRUCTURAL VIBRATION**
- Tracking error frequency response function and human psychomotor performance under aircraft vertical and lateral vibration conditions [AD-719754] N71-25087
- SUBMERGING**
- Long term immersion effects on human water-salt metabolism, noting increased erythrocyte water contents and hematocrit index A71-28403
- Heat balance of human body submerged in water, determining body temperature reduction as function of ambient temperature A71-28508
- Xe 133 elimination from anterior tibial muscles in dry and water immersed sitting subjects, discussing effects of air and oxygen breathing A71-29358
- SUBSONIC AIRCRAFT**
- Large subsonic jet aircraft civil pilots performance under physiological and psychological stresses induced during severe atmospheric turbulence A71-29783
- SUGARS**
- Catalytic effect of lanthanide hydroxides on formaldehyde conversion to pentoses and hexoses at 110 C in life support systems A71-28408
- SUNLIGHT**
- Night vision and dark adaptation of eye, noting sunlight effects on visual acuity A71-28392
- SUPersonic AIRCRAFT**
- V/STOL and supersonic commercial aircraft developments, comparing man and machine performance as information processing systems for aircraft control and navigation A71-28486
- SUPINE POSITION**
- Sitting and supine position effect on exercise tolerance, heart rate, systolic pressure and respiration rate in male subjects with coronary insufficiency, noting onset of angina pectoris A71-29303
- SURVIVAL**
- Germ survival and transport possibility in outer space, discussing spore survival under UV radiation A71-28691
- SURVIVAL EQUIPMENT**
- Voice communication, direction finding, and radio homing equipment development for search and rescue by air [AD-715310] N71-24414
- Aircraft survival equipment testing including maintainability, systems compatibility, human factors engineering, and reliability of rations, protective clothing, floats, and parachutes [AD-720225] N71-26138
- SWEAT**
- Heat acclimatization effects on sweat Na concentration over wide sweat rates range, discussing possible mechanisms A71-29498
- SWIMMING**
- Trained college and recreational swimmers cardiac output and maximum oxygen consumption during tethered swimming and treadmill running A71-29496
- Metabolic, ventilator and cardiovascular response during free swimming and treadmill walking, relating oxygen consumption to work intensity A71-29500
- SWINE**
- Radiobiological plasma and blood volume measurements on humans and swine [CEA-R-4031] N71-24627
- SYMPATHETIC NERVOUS SYSTEM**
- Vago sympathetic nerve trunk stimulation effects on pulmonary blood volume changes magnitudes and pattern in isolated perfused lungs A71-31135
- SYNAPSES**
- Extrajunctional /briefly latent/ postsynaptic negative component of evoked visual potential in cortex of nembutal anesthetized rabbits, using Alvar biphasic oscillator A71-27894
- SYNCOPE**
- Sudden death and syncope mechanism in aortic valve stenosis, noting presence of baroceptors in left ventricular wall A71-29301
- SYSTEMS ANALYSIS**
- Control analysis of regenerative spacecraft cabin atmosphere system for earth orbiting manned missions of up to 1 year duration [NASA-TN-D-6139] N71-26019
- SYSTEMS COMPATIBILITY**
- Aircraft survival equipment testing including maintainability, systems compatibility, human factors engineering, and reliability of rations, protective clothing, floats, and parachutes [AD-720225] N71-26138
- SYSTEMS ENGINEERING**
- Personnel training in airline operations technology at Friedrich List Transportation Institute for aircraft pilots, flight safety engineers and systems engineers A71-29143
- Patient monitoring system design and equipment specifications with physiological response display device and warning system [NASA-CR-118645] N71-25942
- Zero-gravity absorption refrigeration system design and performance testing for space station environmental control application [NASA-CR-103114] N71-26390
- SYSTOLIC PRESSURE**
- Baroreflex regulation of pulse interval during bicycling exercise, using systolic pressure-pulse relation to express reflex sensitivity A71-28951
- Sitting and supine position effect on exercise tolerance, heart rate, systolic pressure and respiration rate in male subjects with coronary insufficiency, noting onset of angina pectoris A71-29303
- T**
- TABLES (DATA)**
- Initial evaluation of revised helium-oxygen decompression tables [AD-719388] N71-24683
- TARGET ACQUISITION**
- Visual detection probability for moving target against static target [AD-720800] N71-25849
- Sensory modes of flies, bees, and moths applied to target acquisition and tracking [AD-720412] N71-25958
- TASK COMPLEXITY**
- Model for task interference with pilot performance in multivariable manual control systems [NASA-CR-1746] N71-26160
- TASTE**
- Evoked cortical responses to taste solutions of acid and salt applied to human tongue surface, using averaging technique A71-28887
- TAYLOR MANIFEST ANXIETY SCALE**
- Correlation of impulse level based on manifest anxiety and recognition of peripherally

introduced visual stimuli against moving background [RAE-LIB-TRANS-1552]	N71-25146	THYROID GLAND Thyroidectomized vitamin A deficient rats, noting visual sensitivity loss not correlated to thyroid
<b>TELEVISION SYSTEMS</b> F-4E aircraft in-flight television recording system for gunnery training [AD-720245]	N71-26174	A71-28455
<b>TEMPERATURE CONTROL</b> Steady state and dynamic experiments to determine thermoregulatory heat production in human subjects [AD-720831]	N71-25766	<b>TIBIA</b> Bending and torsional oscillations in rectangular specimens of femur and tibia, calculating elastic and shear moduli of compact bone tissues
<b>TEMPERATURE EFFECTS</b> Heat balance of human body submerged in water, determining body temperature reduction as function of ambient temperature	A71-28508	A71-28658
Mars physical conditions compared to earth, simulating Martian conditions and low temperature and UV effects on proteins	A71-28688	Xe 133 elimination from anterior tibial muscles in dry and water immersed sitting subjects, discussing effects of air and oxygen breathing
Adrenocortical function in garden dormouse during autumnal preparation for hibernation, considering environmental temperature factors	A71-29315	A71-29358
microwave exposure effects on organisms and biological functions responses and thermal stresses as function of specific frequencies, power density and environmental temperature	A71-29325	<b>TIME DISCRIMINATION</b> Spatio-temporal patterns in visual contrast sensitivity, noting exaggerated eye movements effects
Skin temperature sensitivity factors, discussing neural correlates of thermal sensation and skin receptors causing thermal stimulation sensitivity	A71-30253	A71-28462
Temperature, odor mixing and stimulation frequency effects on olfactory receptor potential of fly <i>Lucilia sericata</i>	A71-30568	Intramodal and crossmodal sensory transfer of visual and auditory temporal patterns in normal young adults
Effects of atmospheric gas and moisture concentration, temperature, pressure, and wind velocity on human performance and skin water loss rate [NASA-CR-115024]	N71-26385	A71-29326
<b>THALAMUS</b> Brain stem mechanisms underlying visual discrimination in rhesus monkeys subjected to bilateral lesions of the inferotemporal cortex, posterior thalamus or midbrain	A71-28807	Spatial and temporal discrimination functions in vision, audition and touch, establishing and controlling stimuli by vibrators
<b>THERMAL CONDUCTIVITY</b> Cerebrum temperature variations and tissue insulating and heat conducting properties in ether anesthetized dogs with heads cooled by water stream	A71-28029	A71-30252
<b>THERMOREGULATION</b> Local cutaneous heat regulation in man, using thermoconvectance method in analyzing response to constant temperature thermode application to small skin surface	A71-29314	<b>TIME LAG</b> Visual sensation time theory validity investigation, discussing time elapsed between retinal receptor stimulation and perceptory sensation
Mathematical and mechanical models of human thermal system thermodynamic/transport processes and external regulation devices for single elements and entire body	A71-29400	A71-30406
<b>THIAMINE</b> Solid and liquid diets during thiamine deficiency, noting hunger dependence on novelty	A71-28808	<b>TIME MEASUREMENT</b> Rat 24 hour clock inborn nature, discussing dependence on alternating light-dark periods for time measurement
<b>THRESHOLDS (PERCEPTION)</b> Dark adapted albino rats behavioral assessment, measuring absolute visual thresholds to white and colored light	A71-28457	A71-28801
Vertical translational acceleration perception threshold of aircraft pilot seated in upright position	A71-29780	<b>TISSUES (BIOLOGY)</b> Dietary pyridoxal deficiency, causing amino acid content reduction in liver, kidney, brain and heart tissues
Fly <i>Lucilia sericata</i> olfactory receptor and unit action potentials response to odor stimulation by homologous compounds	A71-30569	A71-27837
Investigation of visual perception ability during acceleration and deceleration and thresholds for perceived motion changes	N71-24727	Cerebrum temperature variations and tissue insulating and heat conducting properties in ether anesthetized dogs with heads cooled by water stream
		A71-28029
		Reduced diaphragmatic muscle tissue resistance in rats during prolonged hypokinesia, showing sorption of basic vital neutral red stain
		A71-28417
		Human tissues neutron induced physical doses calculation
		A71-29260
		Heat transfer through human peripheral tissue based on one dimensional steady state continuum model combining effects of conduction, convection, vascular heat exchange and metabolism
		A71-29502
		Hypothermia effect on lipid synthesis of hamster tissue following intravenous injection of acetate-C 14
		A71-29582
		Pyruvate and lactate concentrations in muscle tissue and blood at rest and during exercise
		A71-31136
		<b>TOLERANCES (PHYSIOLOGY)</b> Ar, N and Ne partial pressure tolerance in dogs, plotting saturation curves
		A71-28038
		Simple organisms resistance and adaptation to low pressure, anoxia, intense cooling, UV irradiation and Mars conditions
		A71-28687
		Physiological effects and design criteria for artificial gravity space station
		N71-24454
		<b>TONGUE</b> Evoked cortical responses to taste solutions of acid and salt applied to human tongue surface, using averaging technique
		A71-28887
		<b>TORSIONAL VIBRATION</b> Bending and torsional oscillations in rectangular specimens of femur and tibia, calculating elastic and shear moduli of compact bone tissues
		A71-28658

<b>TOUCH</b>	Spatial and temporal discrimination functions in vision, audition and touch, establishing and controlling stimuli by vibrators	A71-30252	temperature and UV effects on proteins A71-28688
<b>TOXICITY</b>	Pulmonary oxygen toxicity, considering composition of endobronchial saline extracts of rats and edema development	A71-29362	Germ survival and transport possibility in outer space, discussing spore survival under UV radiation A71-28691
<b>TOXICOLOGY</b>	Toxicological evaluation of CO in humans and other mammals, considering pilot performance prediction for aircraft environment	A71-28902	Space objects sterilization techniques in Soviet Union and United States, covering hot air, ionizing radiation, UV light, ethylene oxide with or without Freon, etc A71-28694
<b>TRACKING (POSITION)</b>	Performance and recovery characteristics of men when subjected to prolonged whole body vertical vibration	N71-26432	UNDERWATER TESTS
<b>TRAINING DEVICES</b>	Flight training program for twin-engine transition, using commercially available training device [SAE PAPER 71040] A71-28345	Nutritional requirements of aquanauts under open underwater stations and weightlessness [JPRS-53161] N71-26622	
	Monkeys trained to observe and report two-member serial position sequences with delayed matching-to-sample procedure A71-29519	URINE	
	F-4E aircraft in-flight television recording system for gunnery training. [AD-720245] N71-26174	Physiological and biochemical characterization of natriuretic hormone in human urine and blood plasma A71-28952	
<b>TRAINING SIMULATORS</b>	Flight crew training ground school programs, featuring automated instruction in cockpit classroom with audio visual machines [SAE PAPER 710478] A71-28343	Radioisotope fueled distillation system for reclaiming potable water from urine on prolonged space flight [AD-718965] N71-24412	
<b>TRANSDUCERS</b>	Standard transducers applied to bioengineering research problems N71-26366	Automated procedure for direct cell count of bacteria in urine by bioluminescence reaction of luciferase when mixed with ATP [NASA-TM-X-65521] N71-25035	
<b>TRANSFER FUNCTIONS</b>	Mathematical model for short term adaptation to vestibular stimuli, deriving transfer function relating angular velocities of nystagmus and head rotation A71-30250	UROLOGY	
	Linear transfer function for describing human response to aircraft control N71-24710	Animal urinary bladder mechanical properties from controlled stretch tests, identifying viscoelastic, plastoelastic and creep elements A71-30566	
<b>TRANSFER OF TRAINING</b>	Learning sets development relation to transfer suppression, discussing previously learned discriminations retention A71-28803	V	
	Monkeys trained to observe and report two-member serial position sequences with delayed matching-to-sample procedure A71-29519	<b>V/STOL AIRCRAFT</b>	
<b>TRANSLATIONAL MOTION</b>	Vertical translational acceleration perception threshold of aircraft pilot seated in upright position A71-29780	V/STOL and supersonic commercial aircraft developments, comparing man and machine performance as information processing systems for aircraft control and navigation A71-28486	
<b>TUMORS</b>	Measurement of oxygen effect and biological effectiveness of 910 MeV helium ion beam using cultured human kidney cells of interest in radiotherapeutic treatment of hypoxic tumors [UCRL-20190] N71-25241	Head- or helmet-mounted display/control system in V/STOL aircraft for pilot workload and training reduction [AHS PREPRINT 532] A71-31093	
<b>ULTRASONIC TESTS</b>	Ultrasonic echocardiograms of anterior cusp of mitral valve in aortic valve disease A71-27814	<b>VACCINES</b>	
	Ultrasonic/radiographic method for intraocular foreign body localization A71-29031	Cleanliness control effects on aircraft components and immunization vaccine productions in Sweden [FOA-1-C-1325-76] N71-26566	
<b>ULTRAVIOLET PHOTOMETRY</b>	Visible and UV photometric recording of microorganism reproduction in liquid medium for application to Mars extraterrestrial life detection A71-28682	<b>VACUUM EFFECTS</b>	
	Mars physical conditions compared to earth, simulating Martian conditions and low	Bacteria and yeast strains, fungus specimens and seaweed species high vacuum resistance, noting microorganisms interplanetary transport in outer space A71-28689	
<b>ULTRAVIOLET RADIATION</b>		<b>VASCULAR SYSTEM</b>	
		Blood liquid state control in sanguiferous canal as function of humoral feedback in coagulation, fibrinolytic and anticoagulation systems A71-28718	
		Coronary blood flow response to acute and chronic hypoxia, observing vascular smooth muscle relaxation relation to released adenosine A71-30281	
		Coronary vasculature development under hypoxia and pulmonary hypertension as possible cause of right ventricle phasic flow contour changes A71-30282	
		<b>VECTORCARDIOGRAPHY</b>	
		Stochastic identification method for transforming ECG and VCG data to approximate diagnosis, using computerized dipole models A71-29002	
		<b>VENTING</b>	
		Venting device for pressurized space suit helmet to eliminate vomit expelled by crewmen [NASA-CASE-XMS-09652-1] N71-26333	
		<b>VERTEBRAL COLUMN</b>	
		Spinal column radiographic examination after pilot ejection, discussing vertebral injuries detection A71-28510	
		<b>VERTICAL MOTION</b>	
		Vertical translational acceleration perception threshold of aircraft pilot seated in upright position A71-29780	

**VESTIBULAR TESTS**

- Humans and animals vestibular stimuli effect on external respiration function and respiration center neuron activity A71-28413
- Somatic and autonomic responses in vestibular tolerance of human subjects, using Coriolis acceleration test A71-28414
- Soviet book on vestibular reactions covering functional relationship between stimulus parameters and labyrinth nonauditory part, adaptation to Coriolis forces and response to ionizing radiation A71-28672
- Rotation perception in dark and oculogyral illusion, using power law to describe subjective vestibular sensation relation to angular acceleration stimulus pulses A71-29327
- Hybrid computer program for data reduction or on-line analysis of nystagmus during closed loop experiment involving visual and/or vestibular function A71-29359
- Mathematical model for short term adaptation to vestibular stimuli, deriving transfer function relating angular velocities of nystagmus and head rotation A71-30250
- Pigeon vestibular apparatus fluids and structures physical properties, detailing specific gravity and viscosity of endolymph, perilymph and cupola A71-30467

**VIBRATION EFFECTS**

- Atmospheric turbulence induced aircraft vibrations effects on aircrew performance, discussing physiological and psychological responses A71-29778
- Vibration effects on visual discrimination and tracking abilities in humans [AD-719745] N71-24437
- Measurements of aircrew total vibration exposure during low altitude, high speed flight in F-4C aircraft [AD-720271] N71-26172
- Performance and recovery characteristics of men when subjected to prolonged whole body vertical vibration N71-26432

**VISCOSITY**

- Pigeon vestibular apparatus fluids and structures physical properties, detailing specific gravity and viscosity of endolymph, perilymph and cupola A71-30467

**VISION**

- Dark adapted albino rats behavioral assessment, measuring absolute visual thresholds to white and colored light A71-28457
- Near and intermediate vision in civil aircraft crews, presenting statistical evaluation of age factor effect on visual acuity in professional and nonprofessional personnel A71-28507
- Spatial and temporal discrimination functions in vision, audition and touch, establishing and controlling stimuli by vibrators A71-30252

**VISUAL ACCOMMODATION**

- Eye accommodation range limiting for increased adjustment accuracy of optico-mechanical instruments, considering spectacle lens, telescope, magnifying glass and microscope A71-30416

**VISUAL ACUITY**

- Night vision and dark adaptation of eye, noting sunlight effects on visual acuity A71-28392
- Acuity-dark adaptation in strabismic amblyopia, discussing mechanisms for defects A71-28833

**VISUAL DISCRIMINATION**

- Human visual geometrical illusions and figural aftereffects, determining mechanism locations for spatial patterns physical and phenomenal properties A71-28464

Visual discrimination learning by monkeys with inferotemporal cortex lesions, using positive reinforcers and electric shock punishments A71-28804

Behavioral effects of electrically induced EEG abnormalities in inferotemporal and occipital cortex in monkeys on visual pattern discrimination and successive spatial reversals A71-28806

Brain stem mechanisms underlying visual discrimination in rhesus monkeys subjected to bilateral lesions of the inferotemporal cortex, posterior thalamus or midbrain A71-28807

Luminance and luminous flux discrimination in light and dark reared rats after early visual deprivation A71-28810

Electroencephalographic and evoked cortical potential correlates of reaction time and visual discrimination in humans A71-29345

Monkeys trained to observe and report two-member serial position sequences with delayed matching-to-sample procedure A71-29519

Vibration effects on visual discrimination and tracking abilities in humans [AD-719745] N71-24437

Correlation of impulse level based on manifest anxiety and recognition of peripherally introduced visual stimuli against moving background [RAE-LIB-TRANS-1552] N71-25146

**VISUAL FIELDS**

Cat single optic nerve fibers receptive field, observing functional organization and conduction velocity A71-28458

Human visual system gate type lateral interaction to luminous intensity, noting visual field response to monocular viewing A71-28460

**VISUAL OBSERVATION**

Optical effects observation by air traveler during takeoff, including haze or cloud droplet scattering, halos, shock wave shadows, shallow watercolors and twilight wedge A71-29350

**VISUAL PERCEPTION**

Thyroidectomized vitamin A deficient rats, noting visual sensitivity loss not correlated to thyroid A71-28455

Human visual system gate type lateral interaction to luminous intensity, noting visual field response to monocular viewing A71-28460

Intramodal and crossmodal sensory transfer of visual and auditory temporal patterns in normal young adults A71-29326

Visual perception theoretical models for liminal contrast prediction A71-29442

Eye movements and visual perception, describing scan path for memory traces A71-29801

Visual sensation time theory validity investigation, discussing time elapsed between retinal receptor stimulation and perceptsensation A71-30406

Investigation of visual perception ability during acceleration and deceleration and thresholds for perceived motion changes N71-24727

Signal and stimulus rate effects on long term human response to light signal intensity differences [RM-505] N71-24955

Spatial processing characteristics in perception of brief visual arrays [AD-719797] N71-25623

Visual detection probability for moving target against static target [AD-720800] N71-25849

Picture processing and image evaluation [FOA-2-C-2354-72] N71-26597

**VISUAL PHOTOMETRY**

Visible and UV photometric recording of microorganism reproduction in liquid medium for application to Mars extraterrestrial life detection

A71-28682

**VISUAL SIGNALS**

Model describing symmetrical information processing along visual pathways of brain [NASA-CR-118517]

N71-26204

**VISUAL STIMULI**

Extraprimary /briefly latent/ postsynaptic negative component of evoked visual potential in cortex of nembutal anesthetized rabbits, using Alvar biophase oscillator

A71-27894

Visual cortex neurons impulse activity and postsynaptic potential changes due to light stimuli from quasi-intracellular recordings

A71-28381

Grating pattern vision models, examining single neural network and multiple channel stimulus information processing

A71-28461

Human afterimage and pupillary activity in darkness after strong light exposure, noting dependence on stimulus intensity and duration

A71-28463

Visual evoked cortical response in man related to rate, spatial frequency and wavelength of alternating barred pattern with background illumination

A71-28888

Distinctive visual evoked response potential field patterns resulting from human retina stimulation, using electrode array on occipital scalp

A71-28893

Multiple starlike flashes and short streaks reported by subjects exposed to neutrons under 25 mev, discussing interaction with retinal rods by proton recoils

A71-29353

Correlation of impulse level based on manifest anxiety and recognition of peripherally introduced visual stimuli against moving background [RAE-LIB-TRANS-1552]

N71-25146

**VISUAL TASKS**

Sensomotor activity tests of operator perceiving high speed stimuli in broad visual field for psychological selection of aircraft and spacecraft pilots

A71-28416

**VOLUMETRIC ANALYSIS**

Radiobiological plasma and blood volume measurements on humans and swine [CEA-R-4031]

N71-24627

**VOMITING**

Venting device for pressurized space suit helmet to eliminate vomit expelled by crewmen [NASA-CASE-XMS-09652-1]

N71-26333

**W****WAKEFULNESS**

Natural sleep and wakefulness stages neurophysiology based on bioelectric activity spectral and correlation analyses

A71-28380

Heart rate variability in REM sleep, stage 4 sleep and wakefull state from ECG of normal males, calculating coefficient of temporal variability for each state

A71-29319

**WALKING**

Lower extremities interlink angles correlation and cross correlation functions during walking for locomotor functions analysis in man

A71-28382

Metabolic, ventilator and cardiovascular response during free swimming and treadmill walking, relating oxygen consumption to work intensity

A71-29500

**WARNING SYSTEMS**

Patient monitoring system design and equipment specifications with physiological response display device and warning system [NASA-CR-118645]

N71-25942

**WASHERS (CLEANERS)**

Zero gravity clothes washer utilizing principles of fluidics to provide washing action and reduction in number of components scale model [NASA-CR-114983]

N71-24455

**WATER BALANCE**

Long term immersion effects on human water-salt metabolism, noting increased erythrocyte water contents and hematocrit index

A71-28403

Human fluid balance in artificial environments, and influence of ambient temperature, water vapor pressure, total barometric pressure, wind velocity, and atmospheric gas composition [NASA-CR-114977]

N71-25000

**WATER CONSUMPTION**

Food and water intake changes associated with interruption of hypothalamus anterior or posterior fiber connections

A71-28802

**WATER LOSS**

Effects of atmospheric gas and moisture concentration, temperature, pressure, and wind velocity on human performance and skin water loss rate

N71-26385

**WATER POLLUTION**

Biochemistry, molecular biology, radiochemistry, meteorology, soil science, and water pollution research and development and environmental engineering [AECL-3728]

N71-24889

**WATER RECLAMATION**

Radioisotope fueled distillation system for reclaiming potable water from urine on prolonged space flight [AD-718965]

N71-24412

**WAVE GENERATION**

Factors affecting respiratory waves formation, modulating arterial blood pressure recordings and photoplethysmograms

A71-30411

**WAVEFORMS**

Respiratory wave basic pattern during cat diaphragm artificial activation by electric rectangular stimulus to phrenic nerves

A71-30412

**WEIGHT MEASUREMENT**

Ventricular mass estimation using electrocardiographic parameters

A71-29302

**WEIGHTLESSNESS**

Space flight factors effects on human physiology and psychology, discussing spacecraft gaseous medium control, food supply, closed ecological systems and weightlessness effects

A71-27876

Zero gravity clothes washer utilizing principles of fluidics to provide washing action and reduction in number of components scale model [NASA-CR-114983]

N71-24455

Method and apparatus for applying compressional forces to skeletal structure of subject to simulate force during ambulatory conditions [NASA-CASE-ARC-10100-1]

N71-24738

Effect of weightlessness on cardiovascular and uretic functions in human subjects [AD-719790]

N71-24997

Nutritional requirements of aquanauts under open underwater stations and weightlessness [JPGRS-53161]

N71-26622

**WIND VELOCITY**

Effects of atmospheric gas and moisture concentration, temperature, pressure, and wind velocity on human performance and skin water loss rate

N71-26385

**WORK CAPACITY**

High altitude aerobic working capacity limitations, examining oxygen transport system and circulator factors

A71-30276

**WORK-REST CYCLE**

Diurnal rhythms of human physiological functions and performance during frequently alternating sleep-work cycles

A71-28410

Performance and recovery characteristics of men when subjected to prolonged whole body verticle

vibration

N71-26432

**X****XENON 133**

Xe 133 elimination from anterior tibial muscles in dry and water immersed sitting subjects, discussing effects of air and oxygen breathing  
A71-29358

**Y****YEAST**

Bacteria and yeast strains, fungus specimens and seaweed species high vacuum resistance, noting microorganisms interplanetary transport in outer space  
A71-28689

Acetyl-coenzyme A synthetase in aerobic yeast cells localization in microsomal fraction by density gradients  
A71-31003

Polarization and energy conversion efficiency of yeast and *Bacillus* lactate fermentation for biochemical fuel cells  
N71-26245

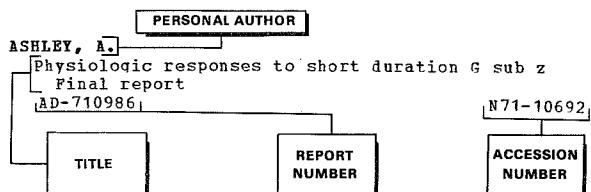


# Personal Author Index

AEROSPACE MEDICINE AND BIOLOGY / A Continuing Bibliography (Suppl. 92)

AUGUST 1971

## Typical Personal Author Index Listing



The title of the document is used to provide the user with a brief description of the subject matter. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

## A

- AARSETH, P.**  
The effect of sympathetic nerve stimulation on pulmonary blood volume in isolated perfused lungs  
A71-31135
- AASTERUD, J. P.**  
Advanced survival avionics development study Final report, Aug. 1969 - Mar. 1970  
[AD-715310] N71-24414
- ABULADZE, G. V.**  
Use of a small computer for averaging evoked brain potentials in a real time scale during long-distance communication  
A71-28385
- ABYZOV, S. S.**  
Microbiological investigations of meteorites  
Spacecraft sterilization  
A71-28693  
A71-28696
- ACKERMAN, P.**  
Incorporation of intravenously injected acetate-2-C<sub>14</sub> into tissue lipids of hypothermic hamsters  
A71-29582
- ADAMS, J. J.**  
Human response in closed loop control of dynamic systems  
N71-24710
- ADEY, W. R.**  
An eight channel micropowered PAM/FM biomedical telemetry system  
A71-30930
- AGOSTONI, E.**  
Topography of pleural surface pressure during simulation of gravity effect on abdomen  
A71-28437
- AKANOV, E. N.**  
Analysis of oxygen output in plant conveyors with steps of different durations  
A71-28406
- ALBIN, R. W.**  
Relative novelty of solid and liquid diet during thiamine deficiency determines development of thiamine-specific hunger  
A71-28808
- ALBUS, J. S.**  
The brain as a model for LSI  
N71-25326
- ALEKSIANIAN, Z. A.**  
Spontaneous activity of neuronal assemblies of subcortical structures during sleep and dreaming
- in man**  
**ALEXANDER, J. K.**  
Decreased coronary blood flow in man following ascent to high altitude  
A71-30283
- ALEXANDER, J. M.**  
Initial evaluation of revised helium-oxygen decompression tables Final report  
[AD-719388] N71-24683
- ALEXANDER, R. S.**  
Mechanical properties of urinary bladder  
A71-30566
- ALFORD, D. K.**  
Circadian rhythm of leaves of Phaseolus angularis plants grown in a controlled carbon dioxide and humidity environment  
A71-29475
- Endogenous short period rhythms in the movements of unifoliate leaves of Phaseolus angularis Wight  
A71-29476
- ALHA, A. R.**  
Detection of alcohol in aviation and other fatalities in Finland  
A71-29366
- ALKALAY, I.**  
Carbon dioxide elimination across human skin  
A71-30567
- ALLAN, J. R.**  
Influence of acclimatization on sweat sodium concentration  
A71-29498
- ALLANSMITH, M. R.**  
Comparison of electrophoretic mobility of tear lysozyme in 50 subjects  
A71-29033
- ALLEN, T. H.**  
Body fat, denitrogenation and decompression sickness in men exercising after abrupt exposure to altitude  
A71-29361
- ALLISON, T.**  
Human odorant evoked responses - Effects of trigeminal or olfactory deficit  
A71-28891
- ANDERSEN, D. O.**  
What's new on the training horizon [SAE PAPER 710477]  
A71-28342
- ANDERSEN, K. L.**  
Respiratory responses to static muscular work  
A71-28436
- ANDERSON, D. E.**  
Preavoidance blood pressure elevations accompanied by heart rate decreases in the dog  
A71-28516
- ANDERSON, R. P.**  
Comparison of electrophoretic mobility of tear lysozyme in 50 subjects  
A71-29033
- ANISIMOV, B. V.**  
Effect of ionized air on the acetylcholine content and choline esterase activity in mice of different strains  
A71-28404
- APPFELBAUM, M.**  
Apparatus making possible prolonged measurements of oxygen consumption /V sub O<sub>2</sub>/, respiratory quotient /R/, and insensitive perspiration in man  
A71-29316
- ARCZYNSKA, W.**  
The amount of H<sub>+</sub> released on ISO-pH oxygenation of human whole blood  
A71-28433

- ATA-MURADOVA, F. A.**  
Extraprimary negative component of the visual potential  
A71-27894
- AUFFRET, R.**  
Concerning three ejections by the same pilot  
A71-28510
- AVERILL, R. D.**  
Control analysis of a regenerative cabin atmosphere system  
[NASA-TN-D-6139] N71-26019
- B**
- BACK, K. C.**  
Toxicological evaluation of carbon monoxide in humans and other mammalian species  
A71-28902
- BAHR, K.**  
Contributions to socialist leadership. I - Basic aspects of socialist leadership as part of socialist management  
A71-28491
- BAKER, M. E.**  
Omnidirectional joint Patent  
[NASA-CASE-XMS-9635] N71-24623
- BALAKHOVSKII, I. S.**  
Metabolism and renal function of the crewmembers of the Soiuz 6, Soiuz 7, and Soiuz 8 spacecraft after flight  
A71-28409
- BALDIN, U. I.**  
Changes in the elimination of xenon-133 from the anterior tibial muscle in man induced by immersion in water and by shifts in body position  
A71-29358
- BANCROFT, R. W.**  
Body fat, denitrogenation and decompression sickness in men exercising after abrupt exposure to altitude  
A71-29361
- BARATS, YU. M.**  
Some aspects of the nutrition of aquanauts in underwater laboratories and in water [JPRS-53161] N71-26622
- BARCON, F.**  
Apparatus making possible prolonged measurements of oxygen consumption /V sub O2/, respiratory quotient /R/, and insensitive perspiration in man  
A71-29316
- BARR, R. C.**  
Selection of the number and positions of measuring locations for electrocardiography  
A71-28149
- BAUM, R. A., JR.**  
Computerized analytical technique for design and analysis of a Sabatier reactor subsystem Final engineering report  
[NASA-CR-115026] N71-26295
- BAUMBER, J.**  
A possible basis for periodic arousals during hibernation - Accumulation of ketone bodies  
A71-29125
- BEATTY, J. D.**  
Physical properties of fluids and structures of vestibular apparatus of the pigeon  
A71-30467
- BELYKOVA, E. V.**  
Influence of a set of extremal factors on biologically active substances  
A71-28688
- BELLMAN, R.**  
Hierarchies of control processes and the evolution of consciousness  
[TR-71-17] N71-25937
- BENHAM, R.**  
Echocardiography of the mitral valve in aortic valve disease  
A71-27814
- BENNETT, G.**  
Human performance in the turbulence environment  
A71-29783
- BERGER, L. R.**  
Effects of hydrostatic pressure on photosynthesis and growth of unicellular marine algae and diatoms Annual progress report, 1 Apr. 1970 - 31 Mar. 1971
- [AD-720401] N71-25867
- BERGEY, G. E.**  
Electrocardiogram recording with pasteless electrodes  
A71-29399
- BERKOW, J. W.**  
Preliminary report of biologic testing of laser protective materials  
A71-29035
- BERLIN, A. A.**  
Effect of rare metal hydroxides on the reaction of formaldehyde condensation into sugars  
A71-28408
- BERNE, R. M.**  
Effects of acute and chronic hypoxia on coronary blood flow  
A71-30281
- BESCH, E. L.**  
Influence of chronic hypoxia on blood gas tensions and pH in domestic fowl  
A71-30565
- BICHSEL, H.**  
Visual phenomena noted by human subjects on exposure to neutrons of energies less than 25 million electron volts  
A71-29353
- BISGARD, G. E.**  
The effect of polycythemia on respiratory sensitivity  
A71-30289
- BISHOP, G. W.**  
Species comparison of cardiac hypertrophy in animals chronically exposed to high altitude [AD-720596] N71-26167
- BONEN, L.**  
Physical properties of fluids and structures of vestibular apparatus of the pigeon  
A71-30467
- BONFILI, H. F.**  
Crew exposure to vibration in the F-4C aircraft during low altitude, high speed flight Final report [AD-720271] N71-26172
- BONGARD, M. M.**  
A new type of lateral interaction in the human visual system  
A71-28460
- BORREDON, P.**  
Relation between the appearance of the lesion current on the ECG in anoxia and the collapse of the phosphorylcreatine content of the myocardium  
A71-28506
- BOSTSARRON, J.**  
Apparatus making possible prolonged measurements of oxygen consumption /V sub O2/, respiratory quotient /R/, and insensitive perspiration in man  
A71-29316
- BOUHUYS, A.**  
Mechanical consequences of airway smooth muscle relaxation  
A71-29497
- BOULOUARD, R.**  
Adrenocortical function during the annual cycle of a hibernant- The garden dormouse, Eliomys quercinus L. II - Activity during autumn- Period of preparation for hibernation  
A71-29315
- BOURNE, J. R.**  
Topological characteristics of the visual evoked response in man  
A71-28893
- BOUTELIER, C.**  
Determination of the zone of thermal neutrality in water  
A71-28508
- BOUVERY, P.**  
Concerning near and intermediate vision among civilian aircrew  
A71-28507
- BOYARSKY, L. L.**  
Changes in the somatosensory cortical evoked potential produced by hypovolemic shock  
A71-27836
- BRADY, J. V.**  
Preavoidance blood pressure elevations accompanied by heart rate decreases in the dog  
A71-28516

- BRAKE, D.**  
Coronary blood flow during short term exposure to high altitude A71-30284
- BRAMMELL, H. L.**  
Coronary blood flow during short term exposure to high altitude A71-30284
- BRAUNWALD, E.**  
Structure and function of the normal myocardium A71-27859
- BREMERMAN, H. J.**  
Self-organizing systems Final report, 1 Jan. 1961 - 14 Apr. 1969 [AD-719930] N71-25652
- BRINTON, G.**  
Heart-rate variability in sleep and wakefulness A71-29319
- BRISTOW, J. D.**  
Effect of bicycling on the baroreflex regulation of pulse interval A71-28951
- BRODY, D. A.**  
Dipole, quadripole, and octapole measurements in isolated beating heart preparations A71-28150
- BROOKSBY, G. A.**  
Nutritional and hormonal aspects of the oxygen toxicity syndrome A71-29360
- BROWN, E. B., JR.**  
Effect of bicycling on the baroreflex regulation of pulse interval A71-28951
- BROWN, S. M.**  
Teaching serial position sequences to monkeys with a delayed matching-to-sample procedure A71-29519
- BRUNETTE, J.-R.**  
Electroretinographic study of the rod-cone break in the dark adaptation curve in man A71-30503
- BRUNNER, D.**  
T wave abnormalities in the electrocardiograms of top-ranking athletes without demonstrable organic heart disease A71-30708
- BUCCI, T. J.**  
Species comparison of cardiac hypertrophy in animals chronically exposed to high altitude [AD-720596] N71-26167
- BUDINGER, T. F.**  
Visual phenomena noted by human subjects on exposure to neutrons of energies less than 25 million electron volts A71-29353
- BURDICK, J. A.**  
Heart-rate variability in sleep and wakefulness A71-29319
- BURTON, R. R.**  
Influence of chronic hypoxia on blood gas tensions and pH in domestic fowl A71-30565
- BUTENKO, S. A.**  
Adenosine triphosphate determination in extraterrestrial life detection A71-28683
- Detection of ferro-porphyrin proteins in extraterrestrial life searches A71-28684
- BYCHENKOVA, V. N.**  
Resistance of Colpoda maupasi infusoria to low pressure, anoxia, and intense cooling A71-28687
- BYRNE-QUINN, E.**  
Evaluation of hypoxic ventilatory drive- findings at high altitude A71-30288
- C**
- CAIRNS, R. B.**  
On fighting in mice - Ontogenetic and experiential determinants A71-28805
- CAMPBELL, E. J. M.**  
Differences between alveolar and arterial P sub CO<sub>2</sub> during rebreathing experiments in resting human subjects
- CARLETON, W. H.** A71-28435  
Fluid balance in artificial environments - Role of environmental variables [NASA-CR-114977] N71-25000
- Fluid balance in artificial environments. 2 - Influence of physiological changes upon rates of skin insensible water loss [NASA-CR-115024] N71-26385
- CARO, P. W.**  
An innovative instrument flight training program [SAE PAPER 710480] A71-28345
- CHACKERIAN, M. J.**  
Nutritional and hormonal aspects of the oxygen toxicity syndrome A71-29360
- CHAGOVERS, N. R.**  
Restitution processes after muscular activity in different temperature conditions A71-30552
- CHANG, H.-K.**  
Convective dispersion of blood gases in curved channel exchangers A71-29004
- CHAPPELLE, E. W.**  
An automated luciferase assay of bacteria in urine [NASA-TM-X-65521] N71-25035
- CHERNIGOVSKII, V. N.**  
Food-choice and consumption control and metabolism A71-28719
- CHERNYSHEVA, V. A.**  
Dynamics of slow potential shifts in the subcortical structures of the human brain during mental activity under conditions of willed alteration of the internal medium of the brain A71-28377
- CHEVALERAUD, J.**  
Concerning near and intermediate vision among civilian aircrew A71-28507
- CHIARINI, A.**  
Estimation of ventricular mass from the electrocardiogram A71-29302
- CHILDERS, D. G.**  
Topological characteristics of the visual evoked response in man A71-28893
- CHULIMOV, G. A.**  
Dynamics and principles of saturation of an organism with indifferent gases A71-28038
- CHUPPINI, L. M.**  
Extrapiramidal negative component of the visual potential A71-27894
- CHURNOSOV, E. V.**  
Certain aspects of the neurophysiology of the stages of natural sleep and wakefulness according to the results of spectral and correlation analyses of bioelectric activity A71-28380
- CLARK, B. A. J.**  
Sunlight and night vision A71-28392
- CLARK, H. J.**  
Training potential of inflight audio/visual recording equipment for the F-4E aircraft [AD-720245] N71-26174
- CLARK, J. M.**  
Rate of development of pulmonary O<sub>2</sub> toxicity in man during O<sub>2</sub> breathing at 2.0 Ata A71-29501
- CLARK, R. L.**  
Advanced survival avionics development study Final report, Aug. 1969 - Mar. 1970 [AD-715310] N71-24414
- CLARK, T. J. H.**  
Differences between alveolar and arterial P sub CO<sub>2</sub> during rebreathing experiments in resting human subjects A71-28435
- CLIVER, D. O.**  
Biocidal effects of silver Final technical report [NASA-CR-114978] N71-24436
- COLE, J. N.**  
Crew exposure to vibration in the F-4C aircraft during low altitude, high speed flight Final report

[AD-720271]	N71-26172		N71-26167
COLEMAN, D. J. A protocol for B-scan and radiographic foreign body localization	A71-29031	DELAHAYE, R. P. Concerning three ejections by the same pilot	A71-28510
COLEMAN, T. G. Whole-body circulatory autoregulation and hypertension	A71-28953	DELHAYE, J.-C. Quantitative analysis of gamma amino butyric acid in brain extracts after long lasting compulsive locomotion and breathing of pure oxygen	N71-24456
COLIN, J. Determination of the zone of thermal neutrality in water	A71-28508	[DLR-FB-71-03]	
COLLINS, G. Ventricular septal defect - Incidence, morbidity, and mortality in various age groups	A71-27862	DELIVORIA-PAPADOPOULOS, M. Coronary blood flow during short term exposure to high altitude	A71-30284
CONNELL, J. B. Assessment of the role of transfer suppression in learning-set formation in monkeys	A71-28803	DESCAMP, V. A. Modification of an astronaut's mock up tool kit Final report	N71-25533
CONSTANTINE, H. Carbon dioxide elimination across human skin	A71-30567	[NASA-CR-103135]	
CORBOY, J. M. Mechanical sterilization of the applanation tonometer. II	A71-29036	DIANOV, A. G. Effects of inert gases on animal organisms exposed to high CO <sub>2</sub> concentrations and different ambient temperatures	A71-28402
COSENTINO, J. Digital simulation of the performance of intermediate size crews - Application and validation of a model for crew simulation	N71-26076	DIGHIERO, J. Hemodynamic response to exercise after beta- adrenergic blockade in normal and labile hypertensive patients	A71-29320
[AD-720354]		DIXON, R. W., JR. Cardiac outputs during maximum effort running and swimming	A71-29496
COX, J. W., JR. Dipole, quadrupole, and octapole measurements in isolated beating heart preparations	A71-28150	DLUSSKAI, I. G. Metabolism and renal function of the crewmembers of the Soiuz 6, Soiuz 7, and Soiuz 8 spacecraft after flight	A71-28409
CRANE, H. D. Research study of a fundus tracker, phase 2 Final report 18 Jan. 1968 - 1 Feb. 1971	N71-24931	DMITRIEVA, L. V. Analysis of oxygen output in plant conveyors with steps of different durations	A71-28406
[NASA-CR-114307]		DOBBS, W. A., JR. Relative importance of nervous control of cardiac output and arterial pressure	A71-27839
CRESCITELLI, F. Visual pigments of the vitamin A-deficient, thyroidectomized rat following vitamin A sub 2 administration	A71-28455	DODGE, H. T. Left ventricular power in man	A71-30709
CULLEN, J. F. Cerebral dysfunction as a cause of pilot failure during training or operational flight	A71-29365	DOLLE, W. C. A technique for recording ECG and deep body temperature signals in the presence of a large amplitude rf field	A71-28864
CUMMING, P. G. Human factors - A general review of UK and US information	A71-29778	DORR, V. A. Effects of environmental parameters upon combustion of fire-resistant materials, potential electrical sources of ignition and analysis of combustion products Summary report, 1 Jan. 1970 - 31 Dec. 1970	
CUNNINGHAM, D. J. C. Effect of bicycling on the baroreflex regulation of pulse interval	A71-28951	[AD-720352]	N71-25925
CUTRONEO, K. R. Circadian rhythm of rat liver and lung collagenase activity	A71-28788	Compendium of hyperbaric fire safety research Final report, 1 Apr. 1966 - 31 Dec. 1970	N71-25954
D		[AD-720353]	
DAMON, E. G. The acute effects of air blast on pulmonary function in dogs and sheep Technical progress report	N71-26302	DRELL, D. Comparison of electrophoretic mobility of tear lysozyme in 50 subjects	A71-29033
[AD-709972]		DUBBS, R. C. An introduction to multiclass pattern recognition in unstructured situations Interim scientific report	
DANGELO, E. Topography of pleural surface pressure during simulation of gravity effect on abdomen	A71-28437	[AD-720812]	N71-25841
DAOUD, F. Increased alveolar-arterial oxygen gradients during treadmill walking at simulated high altitude	A71-30279	Information compression, structure analysis, and decision making with a correlation matrix	N71-25842
DE J. LEE, G. Regulation of the pulmonary circulation	A71-27861	[AD-720811]	
DE LA CRUZ, M. V. Extrinsic factors in the genesis of congenital heart disease	A71-27811	Bayesian decision making and learning for continuous-time Markov systems	N71-25847
DEAN, W. D. Species comparison of cardiac hypertrophy in animals chronically exposed to high altitude		[AD-720810]	
		Pattern recognition with continuous parameter, observable Markov chains	
		[AD-720837]	N71-25850
		Command and control models having biophysical analog Final report	
		[AD-720816]	N71-25864
		DUCROS, H. Reaction mechanism of respiratory gases on potassium superoxide in closed circuit breathing apparatus	
			A71-29113

- DUFFNER, L. R.  
Dark adaptation in strabismic amblyopia - The use of acuity targets  
A71-28833
- DUGAS, D. J.  
An experimental investigation of the effect of target motion on visual detection [AD-720800]  
N71-25849
- DULING, B. R.  
Effects of acute and chronic hypoxia on coronary blood flow  
A71-30281
- DUTCHER, L. R.  
An eight channel micropowered PAM/FM biomedical telemetry system  
A71-30930
- DUTTON, J. M.  
Computer simulation models of human behavior - A history of an intellectual technology  
A71-30461
- E**
- EARL, J. E.  
Artificial gravity space station physiological effects and design criteria [NASA-CR-114982]  
N71-24454
- EDDLEMON, C. O.  
Dipole, quadrupole, and octapole measurements in isolated beating heart preparations  
A71-28150
- EGOROV, B. B.  
Homeostasis in weightlessness [AD-719790]  
N71-24997
- EGOROV, I. A.  
Influence of a set of extremal factors on biologically active substances  
A71-28688
- ELENA, R.  
Hemodynamic response to exercise after beta-adrenergic blockade in normal and labile hypertensive patients  
A71-29320
- ELIOT, R. S.  
Angina and infarction occurring with patent coronary arteries and decreased rate of oxygen release  
A71-30286
- ELKIND, J. I.  
Studies of multivariable manual control systems - A model for task interference [NASA-CR-1746]  
N71-26160
- ELNER, A. M.  
Joint action of various afferents in the regulation of human posture reactions  
A71-27833
- ELSNER, W.  
Power laws for the perception of rotation and the oculogyral illusion  
A71-29327
- EMELIANOV, M. D.  
Effect of adequate vestibular stimuli on the external respiration function and neuron activity of the respiration center  
A71-28413
- ENTENMAN, C.  
Incorporation of intravenously injected acetate-2-C<sup>14</sup> into tissue lipids of hypothermic hamsters  
A71-29582
- ERNEST, J. T.  
Behavioral assessment of absolute visual thresholds in the albino rat  
A71-28457
- F**
- FAN, L.-T.  
A review on mathematical models of the human thermal system  
A71-29400
- FARBER, I.U. V.  
Vestibular reactions  
A71-28672
- FAULKNER, J. A.  
Cardiac outputs during maximum effort running and swimming  
A71-29496
- FEDOROVA, R. I.  
Possibility of the spreading of viable germs in outer space  
A71-28691
- FELDMAN, M. L.  
Anatomical aspects of the cochlear nucleus and superior olivary complex  
A71-30255
- FELLER, D. D.  
Mitotic response to various dietary conditions in the normal and regenerating rat liver  
A71-30069
- FELSHINA, E. I.  
Changes in the water-salt metabolism of humans under conditions of immersion in water  
A71-28403
- FERREN, L.  
A possible basis for periodic arousals during hibernation - Accumulation of ketone bodies  
A71-29125
- FESENKOV, V. G.  
Life conditions in the universe  
A71-28678
- FIEDLER, G.  
The significance of functional diagnostics in aerospace medicine  
A71-28488
- FILLEY, G. F.  
Evaluation of hypoxic ventilatory drive- findings at high altitude  
A71-30288
- FINE, B. S.  
Preliminary report of biologic testing of laser protective materials  
A71-29035
- FINE, S.  
Preliminary report of biologic testing of laser protective materials  
A71-29035
- FIRSTENBERG, A.  
An eight channel micropowered PAM/FM biomedical telemetry system  
A71-30930
- FISHER, G. H.  
Geometrical illusions and figural after-effects - The mechanism and its location  
A71-28464
- FLEIG, A. J.  
An automated luciferase assay of bacteria in urine [NASA-TM-X-65521]  
N71-25035
- FLUGRATH, J. M.  
The effectiveness of selected earmuff-type hearing protectors  
A71-30196
- FLYNN, E. T., JR.  
Effect of immersion on the exchange of oxygen in the lung Final report [AD-719389]  
N71-24682
- FLYNN, E. T.  
Initial evaluation of revised helium-oxygen decompression tables Final report [AD-719388]  
N71-24683
- FLYNN, J. T.  
Dark adaptation in strabismic amblyopia - The use of acuity targets  
A71-28833
- FOELL, W. K.  
Biocidal effects of silver Final technical report [NASA-CR-114978]  
N71-24436
- FOLLE, L. E.  
Hemodynamic response to exercise after beta-adrenergic blockade in normal and labile hypertensive patients  
A71-29320
- FORBES, W. B.  
The visual evoked response obtained with an alternating barred pattern - Rate, spatial frequency and wave length  
A71-28888
- FORSHAW, S. E.  
Guide to noise hazard evaluation  
N71-25559
- FOWLER, W. S.  
Interrelationships of factors affecting pulmonary diffusing capacity  
A71-29493
- FRAZIER, D. T.  
Changes in the somatosensory cortical evoked potential produced by hypovolemic shock  
A71-27836

- PREIKNECHT, G.  
Experimental refutation of some hypotheses on  
'sensation time'  
A71-30406
- FRICHS, L. A.  
Species comparison of cardiac hypertrophy in  
animals chronically exposed to high altitude  
[AD-720596] N71-26167
- FRIESEN, W. O.  
A bloodless method for measurement of diffusing  
capacity of the lungs for oxygen  
A71-29492
- FRIESS, G.  
The problems in maintaining the flying personnel  
in a good state of health  
A71-28487
- FRIMER, M.  
Left ventricular power in man  
A71-30709
- FROEHLICH, G.  
The usefulness of the quick-check audiometry for  
testing the sense of hearing according to  
fitness regulation no. 28  
A71-29821
- FROEHLICH, W. D.  
Impulse level /manifest anxiety/ and the  
recognition of peripherally introduced visual  
stimuli against a moving background  
[RAE-LIB-TRANS-1552] N71-25146
- FROST, J. D., JR.  
EEG sleep analyzer and method of operation Patent  
[NASA-CASE-MSC-13282-1] N71-24729
- FRUHSTORFER, H.  
Habituation and dishabituation of the human vertex  
response  
A71-28890
- FUKADA, Y.  
Receptive field organization of cat optic nerve  
fibers with special reference to conduction  
velocity  
A71-28458
- The relationship between response characteristics  
to flicker stimulation and receptive field  
organization in the cat's optic nerve fibers  
A71-28459
- FULLER, G. C.  
Circadian rhythm of rat liver and lung collagenase  
activity  
A71-28788
- FUNAKOSHI, M.  
Summated cerebral evoked responses to taste  
stimuli in man  
A71-28887
- FUNKHOUSER, G. E.  
Physiological responses in air traffic control  
personnel - O'Hare tower  
[FAA-AM-71-2] N71-24747
- G**
- GALKINA, N. S.  
Features of the alpha rhythm in different cortex  
regions of a healthy human on the basis of  
frequency and correlation analyses data  
A71-30551
- GALLE, R. R.  
The problem of estimating vestibular stability  
A71-28414
- GARDNER, G. T.  
Spatial processing characteristics in the  
perception of brief visual arrays  
[AD-719797] N71-25623
- GASAWAY, D. C.  
Method for assessing A-weighted auditory risk  
limits for protected ears Final report, May -  
Oct. 1970  
[AD-719861] N71-25086
- GAUTHIERIE, M.  
Study of local cutaneous heat regulation in man by  
the thermoconvectance method - Demonstration of  
a cooperative histamine-bradykinin method  
A71-29314
- GAVRILOVA, L. N.  
The problem of estimating vestibular stability  
A71-28414
- GELDARD, F. A.  
Vision, audition, and beyond  
A71-30252
- GELFAND, M.  
An automated data acquisition and analysis system  
for a cardiac catheterization laboratory  
A71-29003
- GENSINI, G. G.  
Pathophysiological correlations in coronary artery  
disease  
A71-30287
- GENTON, E.  
Alterations in blood coagulation at high altitude  
A71-30278
- GEORGE, R. E.  
Jet aircraft emissions and air quality in the  
vicinity of the Los Angeles International  
Airport  
[SAE PAPER 710429] A71-28315
- GERSHTEIN, M. S.  
Hydroelastic effects in the aorta bifurcation zone  
A71-28657
- GITTER, S.  
On the origin of respiratory waves in circulation.  
I  
A71-30411
- On the origin of respiratory waves in circulation.  
II  
A71-30412
- GLASER, R. M.  
Metabolic and cardiorespiratory response during  
free swimming and treadmill walking  
A71-29500
- GLUSHKOV, N. N.  
Use of a small computer for averaging evoked brain  
potentials in a real time scale during  
long-distance communication  
A71-28385
- GNANAPURANI, M.  
Measurement of oxygen effect and biological  
effectiveness of a 910 keV helium ion beam using  
cultured cells /T-1/  
[UCRL-20190] N71-25241
- GOEPFERT, J. M.  
Biocidal effects of silver Final technical report  
[NASA-CR-114978] N71-24436
- GOFF, W. R.  
Human odorant evoked responses - Effects of  
trigeminal or olfactory deficit  
A71-28891
- GOLDRICH, S. G.  
Electrical stimulation of inferotemporal and  
occipital cortex in monkeys - Effects on visual  
discrimination and spatial reversal performance  
A71-28806
- GOLDSCHEIDER, A.  
On the variations of leucocytosis  
[NASA-TT-F-13628] N71-24737
- GOLDSTEIN, L.  
Heart-rate variability in sleep and wakefulness  
A71-29319
- GOODHART, G. L.  
A review of experimental data on the  
cardiovascular response to acceleration  
[AD-719902] N71-25674
- GORLIN, R.  
Regulation of coronary blood flow  
A71-27860
- GOROZHANIN, L. S.  
Influence of oxygen insufficiency on the  
erythrocytic system of splenectomized dogs  
A71-28418
- GOUCHER, C. R.  
Mechanical sterilization of the applanation  
tonometer. II  
A71-29036
- GOULDEN, D. R.  
Aviation medicine translations - Annotated  
bibliography of recently translated material, 6  
[FAA-AM-71-5] N71-24745
- GRAHAM, N.  
Detection of grating patterns containing two  
spatial frequencies - A comparison of  
single-channel and multiple-channels models  
A71-28461
- GRAN, A. A.  
Venting device for pressurized space suit helmet  
Patent  
[NASA-CASE-XMS-09652-1] N71-26333
- GRANGER, H. J.  
Whole-body circulatory autoregulation and  
hypertension

GRASSMAN, E. D.	A71-28953	environmental control system application
Parameter identification as an aid to modeling respiratory sinus arrhythmia Final report, Sep. 1968 - Aug. 1970 [AD-719860]	N71-24953	Interim report [NASA-CR-103114] N71-26390
GREEN, C. T.		HALL, F. F., JR.
Airline pilot's view of 747 training [SAE PAPER 710479]	A71-28344	Optics for the airborne observer A71-29350
GREEN, D. A.		HAMASAKI, D. I.
A carbon dioxide concentrator for space cabin environments	A71-30313	Properties of the epiphysis cerebri of the small-spotted dogfish shark, <i>Scyliorhinus caniculus</i> L A71-28456
GREEN, R. G.		HANNE-PAPARO, N.
Method and apparatus for attaching physiological monitoring electrodes Patent [NASA-CASE-XFR-07658-1]	N71-26293	T wave abnormalities in the electrocardiograms of top-ranking athletes without demonstrable organic heart disease A71-30708
GREENLEAF, C. J.		HARDY, J. C.
Human acclimation and acclimatization to heat A compendium of research [NASA-TM-X-62008]	N71-25393	Omnidirectional joint Patent [NASA-CASE-XMS-9635] N71-24623
GREENLEAF, J. E.		HARPER, C. R.
Human acclimation and acclimatization to heat A compendium of research [NASA-TM-X-62008]	N71-25393	Cerebral dysfunction as a cause of pilot failure during training or operational flight A71-29365
GRIGOREV, A. I.		HARRISON, J. M.
Metabolism and renal function of the crewmembers of the Soiuz 6, Soiuz 7, and Soiuz 8 spacecraft after flight	A71-28409	Anatomical aspects of the cochlear nucleus and superior olivary complex A71-30255
GRIGOREV, IU. G.		HELD, D. R.
Vestibular reactions	A71-28672	The amount of H <sub>+</sub> released on ISO-pH oxygenation of human whole blood A71-28433
GRODINS, F. S.		On the interpretation of the -delta/HCO <sub>3</sub> -//delta pH ratio in respiratory acid-base disturbances A71-28434
Optimal regulation of respiratory airflow	A71-29491	HENDERSON, J., JR.
GROSSMAN, S. P.		A compact six-channel integrated circuit EEG telemeter A71-28889
Changes in food and water intake associated with an interruption of the anterior or posterior fiber connections of the hypothalamus	A71-28802	HENDRIX, J. L.
GROVER, R. F.		A study of polarization and energy conversion in biological fuel cells N71-26245
Limitation of aerobic working capacity at high altitude	A71-30276	HERMAN-GIDDENS, G. S.
Decreased coronary blood flow in man following ascent to high altitude	A71-30283	Selection of the number and positions of measuring locations for electrocardiography A71-28149
Evaluation of hypoxic ventilatory drive- findings at high altitude	A71-30288	HIGGINS, J. D.
The effect of polycythemia on respiratory sensitivity	A71-30289	Set and uncertainty as factors influencing anticipatory cardiovascular responding in humans A71-28809
GRUENBERG, E. M.		HILLE, H. K.
Intramodal and crossmodal sensory transfer of visual and auditory temporal patterns	A71-29326	Crew exposure to vibration in the F-4C aircraft during low altitude, high speed flight Final report [AD-720271] N71-26172
GURTNER, G. H.		HOOPER, W. M.
Interrelationships of factors affecting pulmonary diffusing capacity	A71-29493	Advanced survival avionics development study Final report, Aug. 1969 - Mar. 1970 [AD-715310] N71-24414
GURVICH, G. I.		HOWARD, J.
Creation of an optimal 'color climate' in spacecraft cabins	A71-28411	Measurement of oxygen effect and biological effectiveness of a 910 Mev helium ion beam using cultured cells /T-1/ [UCRL-20190] N71-25241
GUTTENTAG, M.		HOWARD, W. H.
Group effects on individual inferences	N71-25871	Skeletal stressing method and apparatus Patent [NASA-CASE-ARC-10100-1] N71-24738
GUYTON, A. C.		HOWES, W. L.
Relative importance of nervous control of cardiac output and arterial pressure	A71-27839	Relations among loudness, loudness level, and sound pressure level [NASA-TM-X-2298] N71-25789
Whole-body circulatory autoregulation and hypertension	A71-28953	HOWSON, M. G.
GVAKHARIA, Z. V.		Effect of bicycling on the baroreflex regulation of pulse interval A71-28951
Effect of direct electrical stimulation of musculus tensor tympani on click-elicited potentials in the cochlea and cochlear nucleus	A71-27832	HSU, F.-T.
HAGIN, W. V.		A review on mathematical models of the human thermal system A71-29400
What's new on the training horizon [SAE PAPER 710477]	A71-28342	HULTGREN, H. N.
HALE, D. V.		High altitude pulmonary edema A71-30277
Evaluation of absorption cycle for space station		Reduction of systemic arterial blood pressure at high altitude A71-30280
H		HUNG, A. Y.
		An introduction to multiclass pattern recognition in unstructured situations Interim scientific report

[AD-720812]	N71-25841	A synthetase in aerobic yeast cells	A71-31003
HUOT, A.			
Apparatus making possible prolonged measurements of oxygen consumption /V sub O <sub>2</sub> /, respiratory quotient /R/, and insensitive perspiration in man	A71-29316	JAKISCH, N.	
		The radiation exposure of aircraft personnel because of radioactive luminous paint	A71-29145
HUSSEY, M. W.	N71-25533	JAMIESON, G.	
Modification of an astronaut's mock up tool kit Final report		Coronary blood flow during short term exposure to high altitude	A71-30284
[NASA-CR-103135]		JENSEN, K. A.	
HUSTON, R. L.	A71-29832	Investigations into the growth of <i>Bacillus coli</i> by direct microscopic observation. The periodicity of bacteriophage activity studied on the basis of the observations made in the course of these experiments	
Human attitude control		[NASA-TT-F-13652]	N71-24584
HUSTON, S. W.		JOANNES, F.	
An eight channel micropowered PAM/FM biomedical telemetry system	A71-30930	Reaction mechanism of respiratory gases on potassium superoxide in closed circuit breathing apparatus	A71-29113
HWANG, C.-L.		JOHNSON, A. M.	
A review on mathematical models of the human thermal system	A71-29400	Aortic stenosis, sudden death, and the left ventricular baroceptors	A71-29301
		JOLIFF, M.	
IAKOVLEV, N. N.		Apparatus making possible prolonged measurements of oxygen consumption /V sub O <sub>2</sub> /, respiratory quotient /R/, and insensitive perspiration in man	A71-29316
Restitution processes after muscular activity in different temperature conditions	A71-30552	JONES, G. M.	
TAKSHINA, V. M.		A quantitative study of vestibular adaptation in humans	A71-30250
Nutrient media applicable to microorganism detection on Mars	A71-28681	JONES, K. N.	
Behavior of some soil microorganisms in an 'artificial Mars' chamber	A71-28690	Aviation medicine translations - Annotated bibliography of recently translated material, 6	N71-24745
TAMPIETRO, P. F.		[FAA-AM-71-2]	
Physiological responses in air traffic control personnel - O'Hare tower	N71-24747	JONES, R. K.	
[FAA-AM-71-2]		The acute effects of air blast on pulmonary function in dogs and sheep Technical progress report	
Use of skin temperature to predict tolerance to thermal environments	N71-24748	[AD-709972]	N71-26302
[FAA-AM-71-4]		JOUFFRAY, O. L.	
TANSON, KH. A.		A technique for recording ECG and deep body temperature signals in the presence of a large amplitude rf field	A71-28864
Determination of the elastic characteristics of a compact bone tissue by studying the natural oscillation frequencies	A71-28658	JUKES, T. H.	
IMSHENETSKII, A. A.		Deleterious mutations and neutral substitutions	A71-29096
Extraterrestrial life and its detection methods	A71-28677		
Detection of extraterrestrial life	A71-28680		
Effect of a high vacuum on microorganisms	A71-28689	K	
Microbiological investigations of meteorites	A71-28693	KAPLANSKII, A. S.	
Spacecraft sterilization	A71-28696	Infection resistance and immunobiological reactivity of the organism during hypoxic hypoxia	A71-28401
INVERNIZZI, C. G.		KARLSSON, J.	
Ionic conditioning of air [ORNL-TR-2427]	N71-25438	Pyruvate and lactate ratios in muscle tissue and blood during exercise in man	A71-31136
IOFFE, L. A.		KARMANOVA, I. G.	
Changes in the water-salt metabolism of humans under conditions of immersion in water	A71-28403	Certain aspects of the neurophysiology of the stages of natural sleep and wakefulness according to the results of spectral and correlation analyses of bioelectric activity	A71-28380
IOSELIANI, K. K.		KASSIL, G. N.	
A method of studying the sensomotor activity of an operator perceiving stimuli in a broad visual field	A71-28416	Cholinergic activity of human blood during various states of the organism - Nonmediator action of acetylcholine	A71-28384
IUROVA, K. S.		KASSIL, V. G.	
Properties and principles of saturation of an organism with indifferent gases	A71-28038	Food-choice and consumption control and metabolism	A71-28719
IZAKOV, V. IA.		KAWAMURA, Y.	
The nature of the frequency-dependent self-regulatory mechanism of the contraction of myocardium cells	A71-28383	Summated cerebral evoked responses to taste stimuli in man	A71-28887
		KAY, R. E.	
JACOBS, D.		Effect of odor composition and environment on olfactory receptor potential of the fly	A71-30568
Training potential of inflight audio/visual recording equipment for the F-4E aircraft [AD-720245]	N71-26174	Olfactory unit potentials and receptor potential responses of <i>Lucilia sericata</i>	
JAHNKE, L.			
Variations in the localization of acetyl-coenzyme			

- A71-30569  
Investigation of animal sensor and sensor information processing mechanisms for application to target acquisition and tracking Final report, 15 Jan. 1970 - 15 Jan. 1971 [AD-720412] N71-25958
- KEATING, J. M.  
Method and apparatus for attaching physiological monitoring electrodes Patent [NASA-CASE-XFR-07658-1] N71-26293
- KEEFER, J. M.  
Phonocardiogram simulator Patent [NASA-CASE-XKS-10804] N71-24606
- KEITH, J. D.  
Ventricular septal defect - Incidence, morbidity, and mortality in various age groups A71-27862
- KELBAUGH, B. N.  
An automated luciferase assay of bacteria in urine [NASA-TM-X-65521] N71-25035
- KELLER, F. W.  
Dipole, quadripole, and octapole measurements in isolated beating heart preparations A71-28150
- KELLER, K. H.  
An analysis of peripheral heat transfer in man A71-29502
- KELLY, D. H.  
Research study of a fundus tracker, phase 2 Final report 18 Jan. 1968 - 1 Feb. 1971 [NASA-CR-114307] N71-24931
- KENSHALO, D. R.  
Psychophysical studies of temperature sensitivity A71-30253
- KENYON, A. J.  
Biological activity of lunar soil Final report, 7 Jan. - 31 Oct. 1970 [NASA-CR-118671] N71-26399
- KEPRT, E.  
Possibilities of limiting the accommodation range of the eye, with particular reference to the increase of the adjustment accuracy of optico-mechanical instruments A71-30416
- KESTER, F. L.  
Computerized analytical technique for design and analysis of a Sabatier reactor subsystem Final engineering report [NASA-CR-115026] N71-26295
- KEVANISHVILI, G. SH.  
Primary mechanism of the action of an electromagnetic field on living organisms A71-30026
- KEVANISHVILI, Z. SH.  
Effect of direct electrical stimulation of musculus tensor tympani on click-elicited potentials in the cochlea and cochlear nucleus A71-27832
- KHALID, T. M.  
A quantitative approach to performance evaluation of man-machine systems having a stochastic environment A71-29286
- KHALIL, T. M.  
Performance and recovery under prolonged vibration N71-26432
- KHAZEN, I. M.  
Man in space - Physiology and psychology A71-27876
- KHELEMISKII, E. I.  
The problem of estimating vestibular stability A71-28414
- KIDD, B. S. L.  
Ventricular septal defect - Incidence, morbidity, and mortality in various age groups A71-27862
- KIDERAS, G. J.  
Cerebral dysfunction as a cause of pilot failure during training or operational flight A71-29365
- KILMER, W. L.  
A theory of neuromime nets containing recurrent inhibition, with an analysis of a hippocampus model Interim scientific report [AD-720815] N71-25840
- Command and control models having biophysical analogs Final report [AD-720816] N71-25864
- KING, J. L.  
Deleterious mutations and neutral substitutions A71-29096
- KLAMM, R. L.  
Training potential of inflight audio/visual recording equipment for the F-4E aircraft [AD-720245] N71-26174
- KLAUSEN, K.  
Oxygen debt in short-term exercise with concentric and eccentric muscle contractions A71-29495
- KLEIN, H. P.  
Variations in the localization of acetyl-coenzyme A synthetase in aerobic yeast cells A71-31003
- KLIER, S.  
The effect of an explicit response requirement on vigilance performance [RM-505] N71-24955
- KNETS, I. V.  
Determination of the elastic characteristics of a compact bone tissue by studying the natural oscillation frequencies A71-28658
- KNUTTGEN, H. G.  
Oxygen debt in short-term exercise with concentric and eccentric muscle contractions A71-29495
- KOMOLOVA, G. S.  
Influence of a set of extremal factors on biologically active substances A71-28688
- KORNFELD, G. H.  
Visual-perception models A71-29442
- KOROBKOV, A. V.  
Changes in the water-salt metabolism of humans under conditions of immersion in water A71-28403
- KOROBKOVA, I. A.  
Changes in the postsynaptic potential and impulse activity of the visual cortex cells in response to light stimuli of various intensities A71-28381
- KOSMO, J. J.  
Extravehicular tunnel suit system Patent [NASA-CASE-MSC-12243-1] N71-24728
- KOSMOLINSKII, F. P.  
Man in space - Physiology and psychology A71-27876
- KOVDA, V. A.  
The soil sciences and the productivity of the biosphere N71-26456
- KOZHEVNIKOV, E. P.  
Creation of an optimal 'color climate' in spacecraft cabins A71-28411
- KOZYREVSKAI, G. I.  
Metabolism and renal function of the crewmembers of the Soiuz 6, Soiuz 7, and Soiuz 8 spacecraft after flight A71-28409
- KRASNOVA, A. F.  
Restitution processes after muscular activity in different temperature conditions A71-30552
- KROEMER, K. H. E.  
Horizontal static forces exerted by men standing in common working positions on surfaces of various tractions, including coefficients of friction between various floor and shoe materials [AD-720252] N71-26196
- KRYLOV, O. V.  
Effect of rare metal hydroxides on the reaction of formaldehyde condensation into sugars A71-28408
- KUBOKAWA, C.  
Databook for human factors engineers. Volume 2 - Common formulas, metrics, definitions [NASA-CR-114272] N71-25943
- Databook for human factors engineers. Volume 1 - Human engineering data [NASA-CR-114271] N71-25944
- KUDRIASHOV, B. A.  
Problem of the liquid state control in the blood and the relations between the coagulation, fibrinolytic and anticoagulation systems

- KUEHN, L. A. A71-28718  
Physical properties of fluids and structures of vestibular apparatus of the pigeon A71-30467
- KULIKOWSKI, J. J. A71-28462  
Effect of eye movements on the contrast sensitivity of spatio-temporal patterns A71-28462
- KULONEN, E. A71-29362  
Pulmonary oxygen toxicity - Composition of endobronchial saline extracts of rats during exposure to oxygen A71-29362
- KURZENBERGER, J. L. N71-26158  
Kinematic analysis of a six degree of freedom vibration table Final report, 1 Sep. 1969 - 15 May 1970 [AD-720269] A71-28681
- KUZIURINA, L. A. A71-28690  
Nutrient media applicable to microorganism detection on Mars Behavior of some soil microorganisms in an 'artificial Mars' chamber A71-28690
- L**
- LACATIS, D. A71-29316  
Apparatus making possible prolonged measurements of oxygen consumption /V sub O<sub>2</sub>/, respiratory quotient /R/, and insensitive perspiration in man A71-29316
- LACY, C. D. N71-24745  
Aviation medicine translations - Annotated bibliography of recently translated material, 6 [FAA-AM-71-5] A71-28509
- LAFONTAINE, E. A71-28509  
Statistical data on fitness downgrading among operating aircrew of an airline company A71-28509
- LAMBERTSEN, C. J. A71-29501  
Rate of development of pulmonary O<sub>2</sub> toxicity in man during O<sub>2</sub> breathing at 2.0 Ata A71-29501
- LANDAHL, H. D. A71-29001  
Analog simulation of A-V conduction block and Wenckebach phenomenon A71-29001
- LANDEZ, J. H. A71-27837  
Effects of boranes upon tissues of the rat. III - Tissue amino acids in rats on a pyridoxine-deficient diet A71-27837
- LANG, R. N71-26333  
Venting device for pressurized space suit helmet Patent [NASA-CASE-XMS-09652-1] A71-28952
- LANTSBERG, L. A. A71-28403  
Changes in the water-salt metabolism of humans under conditions of immersion in water A71-28403
- LARAGH, J. H. A71-28952  
Further studies of a natriuretic substance occurring in human urine and plasma A71-28952
- LARMORE, L. A71-29350  
Optics for the airborne observer A71-29350
- LARSON, R. W. N71-25001  
Development of compressed nonsweet, flavored snack foods to be used in the Apollo food system Final report, 5 Jan. 1970 - 30 Apr. 1971 [NASA-CR-114996] A71-29352
- LASETER, J. L. A71-29352  
Fatty acid ethyl esters of Rhizopus arrhizus A71-29352
- LASZLO, G. A71-28435  
Differences between alveolar and arterial P sub CO<sub>2</sub> during rebreathing experiments in resting human subjects A71-28435
- LASZLO, M. A71-29319  
Heart-rate variability in sleep and wakefulness A71-29319
- LAURENT, C. A71-29363  
Reaction mechanism of respiratory gases on potassium superoxide in closed circuit breathing apparatus A71-29113
- LAVERNHE, J. A71-28509  
Statistical data on fitness downgrading among operating aircrew of an airline company A71-28509
- LAVNIKOV, A. A. A71-29943  
Fundamentals of aviation medicine A71-29943
- LAWRIE, T. D. V. A71-27812  
Normal ranges of modified axial lead system electrocardiogram parameters A71-27812
- 3 and 12 lead electrocardiogram interpretation by computer - A comparison on 1093 patients A71-27813
- LAWSON, W. R. A71-29442  
Visual-perception models A71-29442
- LAYNE, T. J. A71-28303  
Flight crew training - A total concept [SAE PAPER 710474] A71-28303
- LEBEDEV, E. V. A71-28406  
Analysis of oxygen output in plant conveyors with steps of different durations A71-28406
- LECEROF, H. A71-29303  
Influence of body position on exercise tolerance, heart rate, blood pressure, and respiration rate in coronary insufficiency A71-29303
- LEET, D. G. N71-25840  
A theory of neuromime nets containing recurrent inhibition, with an analysis of a hippocampus model Interim scientific report [AD-720815] A71-25840
- LEGENKOV, V. I. A71-28409  
Metabolism and renal function of the crewmembers of the Soiuz 6, Soiuz 7, and Soiuz 8 spacecraft after flight A71-28409
- LENDA, J. A. N71-25533  
Modification of an astronaut's mock up tool kit Final report [NASA-CR-103135] A71-25533
- LENFANT, C. A71-29494  
Shift of the O<sub>2</sub>-Hb dissociation curve at altitude - Mechanism and effect A71-29494
- LENKOVA, R. I. A71-30552  
Restitution processes after muscular activity in different temperature conditions A71-30552
- LEON, H. A. A71-29360  
Nutritional and hormonal aspects of the oxygen toxicity syndrome A71-29360
- LESSARD, C. S. A71-29363  
Psychobiologic effects of prolonged bed rest - weightless - in young, healthy volunteers - Study II A71-29363
- LEVCHENKO, N. A. A71-30289  
The effect of polycythemia on respiratory sensitivity A71-30289
- LEVINE, L. A71-29480  
Immunochemical studies on pepsinogens A, C and D from the smooth dogfish, *Mustelus Canis* A71-29480
- LEVINGER, I. M. A71-30411  
On the origin of respiratory waves in circulation. I A71-30411
- On the origin of respiratory waves in circulation. II A71-30412
- LEVISON, W. H. A71-26160  
Studies of multivariable manual control systems - A model for task interference [NASA-CR-1746] A71-26160
- LEWIS, O. F. A71-29363  
Psychobiologic effects of prolonged bed rest - weightless - in young, healthy volunteers - Study II A71-29363
- LIALIN, V. S. A71-29363  
Correlation analysis of the kinematic-dynamic

## PERSONAL AUTHOR INDEX

MARRONI, M. A., JR.

- structure of walking in man A71-28382
- LICKO, V.  
Analog simulation of A-V conduction block and Wenckebach phenomenon A71-29001
- LINDGREN, W. A.  
Automated Microbial Metabolism Laboratory Final report [NASA-CR-118659] N71-26380
- LISOVSKII, G. M.  
Cultivation of cereals as a possible component of the autotrophic unit of a life support system A71-28405
- LITSOV, A. N.  
Daily physiological-function and efficiency periodics of man under conditions of a frequent alternation of sleep and wakefulness periods A71-28410
- LIU, C. K.  
Evaluation of absorption cycle for space station environmental control system application Interim report [NASA-CR-103114] N71-26390
- LLOYD, A. J.  
Surface electromyography during sustained isometric contractions A71-29499
- LOEWENFELD, I. E.  
Iris mechanics. I - Influence of pupil size on dynamics of pupillary movements A71-29032
- Iris mechanics. II - Influence of pupil size on details of iris structure A71-29034
- LORIMER, A. R.  
Normal ranges of modified axial lead system electrocardiogram parameters A71-27812
- 3 and 12 lead electrocardiogram interpretation by computer - A comparison on 1093 patients A71-27813
- LOZANO, E. R.  
Jet aircraft emissions and air quality in the vicinity of the Los Angeles International Airport [SAE PAPER 710429] A71-28315
- LOZINA-LOZINSKII, L. K.  
Resistance of Colpoda maupasi infusoria to low pressure, anoxia, and intense cooling A71-28687
- LUEKER, R. D.  
Coronary blood flow during short term exposure to high altitude A71-30284
- LUPCHANOWSKI, R.  
Decreased coronary blood flow in man following ascent to high altitude A71-30283
- LUFT, U. C.  
The acute effects of air blast on pulmonary function in dogs and sheep Technical progress report [AD-709972] N71-26302
- LUNDE, P. J.  
Computerized analytical technique for design and analysis of a Sabatier reactor subsystem Final engineering report [NASA-CR-115026] N71-26295
- LUNDGREEN, C. E. G.  
Changes in the elimination of xenon-133 from the anterior tibial muscle in man induced by immersion in water and by shifts in body position A71-29358
- LUNDVALL, J.  
Changes in the elimination of xenon-133 from the anterior tibial muscle in man induced by immersion in water and by shifts in body position A71-29358
- LUTOMIRSKI, F. R.  
Induced fields and heating within a cranial structure irradiated by an electromagnetic plane wave [AD-720589] N71-26168
- LYMAN, J. T.  
Measurement of oxygen effect and biological effectiveness of a 910 MeV helium ion beam using
- cultured cells /T-1/  
[UCRL-20190] N71-25241
- LYSENKO, S. V.  
Effect of a high vacuum on microorganisms A71-28689
- M**
- MACFARLANE, P. W.  
Normal ranges of modified axial lead system electrocardiogram parameters A71-27812
- 3 and 12 lead electrocardiogram interpretation by computer - A comparison on 1093 patients A71-27813
- MACK, G.  
Does the brain have symmetry /ques/ [NASA-CR-118517] N71-26204
- MACKAY, H. A.  
Teaching serial position sequences to monkeys with a delayed matching-to-sample procedure A71-29519
- MACKEDANZ, A.  
The radiation exposure of aircraft personnel because of radioactive luminous paint A71-29145
- MACKEN, D.  
Preliminary report of biologic testing of laser protective materials A71-29035
- MAGEL, J. R.  
Metabolic and cardiorespiratory response during free swimming and treadmill walking A71-29500
- MAIER, S. F.  
Relative novelty of solid and liquid diet during thiamine deficiency determines development of thiamine-specific hunger A71-28808
- MAIO, D. A.  
Body fat, denitrogenation and decompression sickness in men exercising after abrupt exposure to altitude A71-29361
- MAJORANO, C.  
Estimation of ventricular mass from the electrocardiogram A71-29302
- MAKOGONENKO, G. I.  
Reduction of redundant information during analysis of electrocardiograms described by Legendre polynomials A71-28376
- MALAGNINO, G.  
Estimation of ventricular mass from the electrocardiogram A71-29302
- MALCOLM, R.  
The perception of vertical translational motion by human subjects seated in the upright position A71-29780
- A quantitative study of vestibular adaptation in humans A71-30250
- HALTON, P. M.  
The protection of astronauts against solar flares A71-29252
- MAMASAKHLISOV, G. V.  
Joint action of various afferents in the regulation of human posture reactions A71-27833
- MANNING, F. J.  
Punishment for errors and visual-discrimination learning by monkeys with inferotemporal cortex lesions A71-28804
- MANOACH, M.  
On the origin of respiratory waves in circulation. I A71-30411
- On the origin of respiratory waves in circulation. II A71-30412
- MARRONI, M. A., JR.  
Omnidirectional joint Patent [NASA-CASE-XMS-9635] N71-24623
- Poreshortened convolute section for a pressurized suit Patent [NASA-CASE-XMS-09637-1] N71-24730

- MARTINS, B.  
Measurement of oxygen effect and biological effectiveness of a 910 MeV helium ion beam using cultured cells /T-1/  
[UCRL-20190] N71-25241
- MASLOVA, M. N.  
Functional-biochemical changes in the brains of rats during the initial stage of increased oxygen pressure A71-27810
- MATVEEV, A. P.  
Correlation analysis of the kinematic-dynamic structure of walking in man A71-28382
- MATVEEV, Iu. K.  
Spontaneous activity of neuronal assemblies of subcortical structures during sleep and dreaming in man A71-28378
- MAUSTELLER, J. W.  
A carbon dioxide concentrator for space cabin environments A71-30313
- MAY, J. G.  
The visual evoked response obtained with an alternating barred pattern - Rate, spatial frequency and wave length A71-28888
- MAZUR, P.  
Basic and mission research in the biological sciences at ORNL [ORNL-TM-3218] N71-25551
- MC KENZIE, J. M.  
Physiological responses in air traffic control personnel - O'Hare tower [FAA-AM-71-2] N71-24747
- MCARDLE, W. D.  
Metabolic and cardiorespiratory response during free swimming and treadmill walking A71-29500
- MCCUTCHEON, E. P.  
Changes in the somatosensory cortical evoked potential produced by hypovolemic shock A71-27836
- MCILROY, M. B.  
A bloodless method for measurement of diffusing capacity of the lungs for oxygen A71-29492
- MEDINA, M. A.  
Effects of monoamine oxidase inhibitors and reserpine on brain amines in altitude exposed rats Interim report, Nov. 1969 - Jan. 1970 [AD-720808] N71-25957
- MEERSON, F. Z.  
Mechanism of hypertrophy of the heart and experimental prevention of acute cardiac insufficiency A71-27864
- MEESSEN, H.  
Structural bases of myocardial hypertrophy A71-27863
- MELESJKO, G. I.  
Regeneration of spaceship cabin atmospheres by means of unicellular algae [AD-719831] N71-25099
- MELLANDER, S.  
Changes in the elimination of xenon-133 from the anterior tibial muscle in man induced by immersion in water and by shifts in body position A71-29358
- MELTON, C. E., JR.  
Physiological responses in air traffic control personnel - O'Hare tower [FAA-AM-71-2] N71-24747
- VELLILL JONES, G.  
The perception of vertical translational motion by human subjects seated in the upright position A71-29780
- MERRITT, T. G.  
Immunochemical studies on pepsinogens A, C and D from the smooth dogfish, *Mustelus Canis* A71-29480
- MERRITT, J. H.  
Effects of monoamine oxidase inhibitors and reserpine on brain amines in altitude exposed rats Interim report, Nov. 1969 - Jan. 1970 [AD-720808] N71-25957
- MERTENS, R. A.  
Aviation medicine translations - Annotated bibliography of recently translated material, 6 [FAA-AM-71-5] N71-24745
- MESSEL, E.  
An automated data acquisition and analysis system for a cardiac catheterization laboratory A71-29003
- METZGER, C. A.  
Application of radioisotopes to water recovery system for extended manned aerospace missions Final report, Apr. 1968 - Mar. 1970 [AD-718965] N71-24412
- MEYER, D. R.  
Assessment of the role of transfer suppression in learning-set formation in monkeys A71-28803
- MICHAELSON, S. M.  
Biomedical aspects of microwave exposure A71-29325
- MILEKHINA, E. I.  
Adenosine triphosphate determination in extraterrestrial life detection A71-28683
- MITCHELL, J. R. A.  
Hypertension and arterial disease A71-27866
- MITCHELL, K., JR.  
The acute effects of air blast on pulmonary function in dogs and sheep Technical progress report [AD-709972] N71-26302
- MIZUKAMI, H.  
Angina and infarction occurring with patent coronary arteries and decreased rate of oxygen release A71-30286
- MOCKROS, L. F.  
Convective dispersion of blood gases in curved channel exchangers A71-29004
- MOISEEVA, N. I.  
Spontaneous activity of neuronal assemblies of subcortical structures during sleep and dreaming in man A71-28378
- MOLNAR, P. P.  
Thresholds of electroencephalographic and behavioral arousal during various phases of sleep A71-28379
- MONEY, K. E.  
Physical properties of fluids and structures of vestibular apparatus of the pigeon A71-30467
- MONTERA, C. J.  
Instrumentation for man and equipment in simulated space environment A71-30312
- MORRIS, C. J.  
Electroencephalographic and evoked potential correlates of reaction time and visual discrimination performance A71-29345
- MORTON, P. M.  
Flight crew training - A total concept [SAE PAPER 710474] A71-28303
- MUKHARKINA, T. D.  
Changes in the postsynaptic potential and impulse activity of the visual cortex cells in response to light stimuli of various intensities A71-28381
- MUKHIN, L. M.  
Adenosine triphosphate determination in extraterrestrial life detection A71-28683
- MUNOZ-CASTELLANOS, L.  
Extrinsic factors in the genesis of congenital heart disease A71-27811
- MURPHY, J. T.  
A superposition model of the spontaneous activity of cerebellar Purkinje cells A71-29289
- MUSACCHIA, X. J.  
Incorporation of intravenously injected acetate-2-C14 into tissue lipids of hypothermic hamsters A71-29582

- MYERS, R. E.  
Brainstem mechanisms underlying visually guided responses in the rhesus monkey A71-28807
- MYHRE, K.  
Respiratory responses to static muscular work A71-28436
- N**
- NACHMIAS, J.  
Detection of grating patterns containing two spatial frequencies - A comparison of single-channel and multiple-channels models A71-28461
- NADAL-GINARD, B.  
Extrinsic factors in the genesis of congenital heart disease A71-27811
- NAKELSKI, J. S.  
On fighting in mice - Ontogenetic and experiential determinants A71-28805
- NATOCHIN, IU. V.  
Metabolism and renal function of the crewmembers of the Soiuz 6, Soiuz 7, and Soiuz 8 spacecraft after flight A71-28409
- NEFEDOV, IU. G.  
Study of the composition of air exhaled by humans exposed to certain stress effects A71-28412
- NEFF, W. D.  
Contributions to sensory physiology. Volume 4 A71-30251
- NEVILLE, E. D.  
Mitotic response to various dietary conditions in the normal and regenerating rat liver A71-30069
- NEWMAN, L.  
Comparison of electrophoretic mobility of tear lysozyme in 50 subjects A71-29033
- NEWSOME, D. A.  
Afterimage and pupillary activity following strong light exposure A71-28463
- Iris mechanics. I - Influence of pupil size on dynamics of pupillary movements A71-29032
- Iris mechanics. II - Influence of pupil size on details of iris structure A71-29034
- NICOLAYSEN, G.  
The effect of sympathetic nerve stimulation on pulmonary blood volume in isolated perfused lungs A71-31135
- NIINIKOSKI, J.  
Pulmonary oxygen toxicity - Composition of endobronchial saline extracts of rats during exposure to oxygen A71-29362
- NIKKARI, T.  
Pulmonary oxygen toxicity - Composition of endobronchial saline extracts of rats during exposure to oxygen A71-29362
- NIZZA, P.  
Physiological data on swine for use in radiobiology - Plasma and blood volumes [CEA-R-4031] N71-24627
- NOTON, D.  
Eye movements and visual perception A71-29801
- NOVIKOV, V. P.  
Deficit of heat during the cooling of the cerebrum A71-28029
- NOVIKOVA, S. P.  
Effect of ionized air on the acetylcholine content and choline esterase activity in mice of different strains A71-28404
- O**
- OAKLEY, C. M.  
Echocardiography of the mitral valve in aortic valve disease
- ODONNELL, R. D.  
Toxicological evaluation of carbon monoxide in humans and other mammalian species A71-28902
- OLESEN, D. E.  
An eight channel micropowered PAM/FM biomedical telemetry system A71-30930
- ONIANI, T. N.  
Thresholds of electroencephalographic and behavioral arousal during various phases of sleep A71-28379
- OPARIN, A. I.  
Genesis of life on and beyond the earth A71-28679
- ORHAUG, T.  
Report on a conference on picture processing [FOA-2-C-2354-72] N71-26597
- ORLOV, R. S.  
The nature of the frequency-dependent self-regulatory mechanism of the contraction of myocardium cells A71-28383
- ORLOVA, T. A.  
Metabolism and renal function of the crewmembers of the Soiuz 6, Soiuz 7, and Soiuz 8 spacecraft after flight A71-28409
- OSIPOVA, M. M.  
Effects of inert gases on animal organisms exposed to high CO<sub>2</sub> concentrations and different ambient temperatures A71-28402
- OVERY, H. R.  
Effects of pulmonary hypertension and hypoxia on coronary vascular development A71-30282
- P**
- PADDISON, D. I.  
Some experiments to determine acceleration limits for passenger comfort, appendix B N71-26118
- PAIN, R.  
The effect of an explicit response requirement on vigilance performance [RM-505] N71-24955
- PANAYIRCI, E.  
Bayesian decision making and learning for continuous-time Markov systems [AD-720810] N71-25847
- Pattern recognition with continuous parameter, observable Markov chains [AD-720837] N71-25850
- PARIN, V. V.  
Man in space - Physiology and psychology A71-27876
- PARNES, C. A.  
Mechanical sterilization of the applanation tonometer. II A71-29036
- PAROS, J. M.  
Design and development of a microbiological respirometer with space flight applications A71-30344
- PASERELLO, C. E.  
Human attitude control A71-29832
- PATTEN, C. W.  
Method and apparatus for attaching physiological monitoring electrodes Patent [NASA-CASE-XPR-07658-1] N71-26293
- PAUL, O.  
Risks of mild hypertension - A ten-year report A71-27865
- PEARLMAN, J. T.  
Visual pigments of the vitamin A-deficient, thyroidectomized rat following vitamin A sub 2 administration A71-28455
- PEPELIAEV, IU. V.  
Determination of lipids, proteins, and carbohydrates in Chlorella biomass by pyrolysis and gas chromatography A71-28407

- PERDREAU, B.  
Physiological data on swine for use in radiobiology - Plasma and blood volumes [CEA-R-4031] N71-24627
- PERRY, W. W., JR.  
Topological characteristics of the visual evoked response in man A71-28893
- PETERSEN, E. S.  
Effect of bicycling on the baroreflex regulation of pulse interval A71-28951
- PETERSEN, H. E.  
An experimental investigation of the effect of target motion on visual detection [AD-720800] N71-25849
- PETTY, W. C.  
CO<sub>2</sub> narcosis in the rat. I - Effects on respiration and blood parameters. II - Effects on the ECG A71-29364
- PFAFFROD, G. O.  
Determination of the elastic characteristics of a compact bone tissue by studying the natural oscillation frequencies A71-28658
- PHILLIPS, H. A.  
Dipole, quadripole, and octapole measurements in isolated beating heart preparations A71-28150
- PIANTANIDA, T. P.  
The visual evoked response obtained with an alternating barred pattern - Rate, spatial frequency and wave length A71-28888
- PICCIOLI, G. L.  
An automated luciferase assay of bacteria in urine [NASA-TM-X-65521] N71-25035
- PICKERING, T. G.  
Effect of bicycling on the baroreflex regulation of pulse interval A71-28951
- PIIRONEN, P.  
The control of human thermoregulatory heat production, part 2 Final scientific report, 1 Apr. 1966 - 30 Nov. 1970 [AD-720831] N71-25766
- Assessment of regional heat losses for verification of mathematical analogues of the human thermal system, part 1 Final scientific report 1 Apr. 1966 - 30 Apr. 1970 [AD-720830] N71-25953
- PINCE, B. W.  
Design and development of a microbiological respirometer with space flight applications A71-30344
- PLESKUN, W. G.  
Design and fabrication of a passively pressurized suit Final report, Jul. 1968 - Apr. 1970 [AD-720827] N71-25863
- PODVIGIN, N. F.  
Changes in the postsynaptic potential and impulse activity of the visual cortex cells in response to light stimuli of various intensities A71-28381
- POHORECKY, L. A.  
Adrenocortical control of epinephrine synthesis A71-30809
- POLIS, B. D.  
Physiological responses in air traffic control personnel - O'Hare tower [FAA-AM-71-2] N71-24747
- POMMERENCK, C.  
Hemodynamic response to exercise after beta-adrenergic blockade in normal and labile hypertensive patients A71-29320
- POPE, H.  
Differences between alveolar and arterial P sub CO<sub>2</sub> during rebreathing experiments in resting human subjects A71-28435
- PORTER, C. M.  
Left ventricular power in man A71-30709
- PRATHER, J. W.  
Relative importance of nervous control of cardiac output and arterial pressure A71-27839
- PRIDIE, R. B.  
Echocardiography of the mitral valve in aortic valve disease A71-27814
- PRINCIPATO, J. J.  
Human odorant evoked responses - Effects of trigeminal or olfactory deficit A71-28891
- PROCTOR, C. L.  
A quantitative approach to performance evaluation of man-machine systems having a stochastic environment A71-29286
- PRYOR, R.  
Electrocardiographic observations on high altitude residents A71-30285
- PURINIA, B. A.  
Hydroelastic effects in the aorta bifurcation zone A71-28657
- R**
- RADKEVICH, L. A.  
Effect of adequate vestibular stimuli on the external respiration function and neuron activity of the respiration center A71-28413
- RAJU, M. R.  
Measurement of oxygen effect and biological effectiveness of a 910 MeV helium ion beam using cultured cells /T-1/ [UCRL-20190] N71-25241
- REEVES, J. T.  
Increased alveolar-arterial oxygen gradients during treadmill walking at simulated high altitude A71-30279
- REMY, J.  
Physiological data on swine for use in radiobiology - Plasma and blood volumes [CEA-R-4031] N71-24627
- RESNEKOV, L.  
Automation in cardiology A71-27868
- REYNAFARJE, C.  
Shift of the O<sub>2</sub>-Hb dissociation curve at altitude - Mechanism and effect A71-29494
- REZNIK, L. V.  
Functional-biochemical changes in the brains of rats during the initial stage of increased oxygen pressure A71-27810
- RICH, E., JR.  
Automated Microbial Metabolism Laboratory Final report [NASA-CR-118659] N71-26380
- RICHARDSON, P. C.  
Capacitive electrocardiograph electrodes [AD-718958] N71-24413
- RICHTER, C. P.  
Inborn nature of the rat's 24-hour clock A71-28801
- RITTS, J. J.  
A calculation of neutron-induced physical doses in human tissues A71-29260
- ROBERSON, D. E.  
Horizontal static forces exerted by men standing in common working positions on surfaces of various tractions, including coefficients of friction between various floor and shoe materials [AD-720252] N71-26196
- ROEHLICH, F.  
A carbon dioxide concentrator for space cabin environments A71-30313
- ROMAN, J. A.  
Method and apparatus for attaching physiological monitoring electrodes Patent [NASA-CASE-XFR-07658-1] N71-26293
- ROSE, V.  
Ventricular septal defect - Incidence, morbidity, and mortality in various age groups A71-27862
- ROSENBERGER, P. B.  
Behavioral assessment of absolute visual

- thresholds in the albino rat A71-28457 N71-24456
- ROSENHAMER, G. J.  
A bloodless method for measurement of diffusing capacity of the lungs for oxygen A71-29492 A71-30406
- ROSS, A. M.  
Alterations in blood coagulation at high altitude A71-30278 A71-29002
- RUBINSTEIN, L.  
Intramodal and crossmodal sensory transfer of visual and auditory temporal patterns A71-29326 A71-24727
- RUBIO, R.  
Effects of acute and chronic hypoxia on coronary blood flow A71-30281 A71-30254
- RUSECKAS, J. A.  
Design and fabrication of a passively pressurized suit Final report, Jul. 1968 - Apr. 1970 [AD-720827] N71-25863 A71-28721
- RUSSELL, R. O., JR.  
Left ventricular power in man A71-30709 A71-27837
- RUSTENBURG, J. W.  
Development of tracking error frequency response function and aircraft ride quality design criteria for vertical and lateral vibration Final report, 1 Jan. 1969 - 1 Aug. 1970 [AD-719754] N71-25087 A71-28952
- RYBACK, R. S.  
Psychobiologic effects of prolonged bed rest - weightless - in young, healthy volunteers - Study II A71-29363 A71-25143
- RYLANDER, H. G., III  
Capacitive electrocardiograph electrodes [AD-718958] N71-24413 A71-29502
- RYZHKOVA, V. E.  
Study of the composition of air exhaled by humans exposed to certain stress effects A71-28412 A71-25240
- S**
- SABAH, N. H.  
A superposition model of the spontaneous activity of cerebellar Purkinje cells A71-29289 N71-25944
- SADI, I.  
Hemodynamic response to exercise after beta-adrenergic blockade in normal and labile hypertensive patients A71-29320 A71-28695
- SAITO, H.-A.  
The relationship between response characteristics to flicker stimulation and receptive field organization in the cat's optic nerve fibers A71-28459 A71-28510
- SALHANY, J. M.  
Angina and infarction occurring with patent coronary arteries and decreased rate of oxygen release A71-30286 A71-28417
- SALVAGNIAC, H.  
Concerning three ejections by the same pilot A71-28510 A71-28409
- SAMODANOVA, G. I.  
Restitution processes after muscular activity in different temperature conditions A71-30552 A71-26380
- SARKISOV, I. IU.  
Analysis of forces acting on the receptor formations of the semicircular canals during movements of man in rotating systems A71-28415 A71-28409
- SAULGOZIS, IU. ZH.  
Determination of the elastic characteristics of a compact bone tissue by studying the natural oscillation frequencies A71-28658 A71-28460
- SAVINA, V. P.  
Study of the composition of air exhaled by humans exposed to certain stress effects A71-28412 A71-2866
- SCHAEFER, G.  
Quantitative analysis of gamma amino butyric acid in brain extracts after long lasting compulsive locomotion and breathing of pure oxygen A71-28456 A71-28460
- [DLR-FB-71-03]  
SCHEFFLER, P.  
Experimental refutation of some hypotheses on 'sensation time'  
A71-30406
- SCHLOSS, H. S.  
Computation of solutions to the inverse problem of electrocardiography A71-29002
- SCHMIDLER, J. F.  
The visual perception of accelerated motion N71-24727
- SCHUKNECHT, H. F.  
Pathophysiology of the fluid systems of the inner ear A71-30254
- SCHULTE-WINTROP, H.  
The importance of the helicopter for rescuing victims of aircraft accidents A71-28721
- SCOTT, W. W.  
Effects of boranes upon tissues of the rat. III - Tissue amino acids in rats on a pyridoxine-deficient diet A71-27837
- SEALEY, J. E.  
Further studies of a natriuretic substance occurring in human urine and plasma A71-28952
- SEIDLER, F.  
Development trends regarding the piloting of an aircraft and their effects on the training of aircraft personnel A71-28486
- The education of aircraft personnel in the field of 'Aeronautical Operations Technology' at the Institute of Transportation 'Friedrich List' A71-25143
- SEILER, L., JR.  
An analysis of peripheral heat transfer in man A71-29502
- SEIPEL, J. H.  
The magnetic field component of the neural impulse Final report [NASA-CR-118334] N71-25240
- SELBY, P.  
Databook for human factors engineers. Volume 2 - Common formulas, metrics, definitions [NASA-CR-114272] N71-25943
- Databook for human factors engineers. Volume 1 - Human engineering data [NASA-CR-114271] N71-25944
- SEREGIN, V. I.  
Physiology of spore germination - Bacillus stearothermophilus A71-28695
- SERIS, H.  
Concerning three ejections by the same pilot A71-28510
- SEROVA, L. V.  
Change in the tissue resistance in animals during prolonged restriction of motor activity A71-28417
- SGIBNEV, A. K.  
Metabolism and renal function of the crewmembers of the Soiuz 6, Soiuz 7, and Soiuz 8 spacecraft after flight A71-28409
- SHAHEEN, D. G.  
Automated Microbial Metabolism Laboratory Final report [NASA-CR-118659] N71-26380
- SHAKHMATOVA, E. I.  
Metabolism and renal function of the crewmembers of the Soiuz 6, Soiuz 7, and Soiuz 8 spacecraft after flight A71-28409
- SHAPIRO, A. R.  
Induced fields and heating within a cranial structure irradiated by an electromagnetic plane wave [AD-720589] N71-26168
- SHCHADRIN, V. E.  
A new type of lateral interaction in the human visual system A71-28460
- SHEVELEV, V. M.  
The nature of the frequency-dependent self-regulatory mechanism of the contraction of

myocardium cells	A71-28383	locations for electrocardiography	A71-28149
SHILENKO, M. P. Cultivation of cereals as a possible component of the autotrophic unit of a life support system	A71-28405	SPEARMAN, J. D. Crew exposure to vibration in the F-4C aircraft during low altitude, high speed flight Final report [AD-720271]	N71-26172
SHOENBERGER, R. W. Human performance as a function of direction and frequency of whole body vibration Final report, Sep. 1968 - Sep. 1969 [AD-719745]	N71-24437	SQUIRES, R. D. Electrocardiogram recording with pasteless electrodes	A71-29399
SHUMWAY, H. H. A new approach to flight crew training [SAE PAPER 710478]	A71-28343	STALEY, R. W. Nutritional and hormonal aspects of the oxygen toxicity syndrome	A71-29360
SIEGEL, A. I. Digital simulation of the performance of intermediate size crews - Application and validation of a model for crew simulation [AD-720354]	N71-26076	STAMLER, J. Acute myocardial infarction - Progress in primary prevention	A71-27867
SIMONYI, I. Roentgenological aspects in the examination of paranasal sinuses in aviators	A71-29367	STAMM, J. S. Electrical stimulation of inferotemporal and occipital cortex in monkeys - Effects on visual discrimination and spatial reversal performance	A71-28806
SINIAK, IU. E. Effect of rare metal hydroxides on the reaction of formaldehyde condensation into sugars	A71-28408	STARBUCK, W. H. Computer simulation models of human behavior - A history of an intellectual technology	A71-30461
SIPPLE, W. C. Electrocardiogram recording with pasteless electrodes	A71-29399	STARK, L. Eye movements and visual perception	A71-29801
SLEIGHT, P. Effect of bicycling on the baroreflex regulation of pulse interval	A71-28951	STEIN, M. Carbon dioxide elimination across human skin	A71-30567
SMEJKAL, F. W. Combat aircrew rescue simulation Summary report [AD-720238]	N71-26371	STEINER, C. A. On the interpretation of the -delta/HCO3-//delta pH ratio in respiratory acid-base disturbances	A71-28434
SMITH, A. H. Influence of chronic hypoxia on blood gas tensions and pH in domestic fowl	A71-30565	STEINHAUSEN, W. Observations of the cupula in the ampullae of the semicircular canals of the labyrinth of a living pike [NASA-TT-F-13665]	N71-25716
SMITH, D. B. Human odorant evoked responses - Effects of trigeminal or olfactory deficit	A71-28891	STEVENS, P. N. A calculation of neutron-induced physical doses in human tissues	A71-29260
SMITH, M. The metabolism of ingested peroxides Final report, 1 May 1970 - 30 Apr. 1971 [NASA-CR-114998]	N71-24553	STEWART, J. L. Experiments in auditory perception with an analog model for the ear Final report, 10 Apr. 1968 - 10 Apr. 1970 [AD-720246]	N71-26261
SMOAK, R. A. Control analysis of a regenerative cabin atmosphere system [NASA-TN-D-6139]	N71-26019	STEWART, W. A. Rand Symposium on Pilot Training and the Pilot Career Final report [AD-720797]	N71-25792
SODAL, I. E. Evaluation of hypoxic ventilatory drive- findings at high altitude	A71-30288	STRECK, P. Properties of the epiphysis cerebri of the small-spotted dogfish shark, <i>Scyliorhinus caniculus</i> L	A71-28456
SOKOLINSKAIA, R. A. Cholinergic activity of human blood during various states of the organism - Nonmediator action of acetylcholine	A71-28384	STRICKER, S. On the origin of respiratory waves in circulation. I	A71-30411
SOKOLOFF, M. Physical properties of fluids and structures of vestibular apparatus of the pigeon	A71-30467	On the origin of respiratory waves in circulation. II	A71-30412
SOKOLOV, N. L. Study of the composition of air exhaled by humans exposed to certain stress effects	A71-28412	STROTHER, D. D. Head-mounted display and control system in V/STOL operations [IAHS PREPRINT 532]	A71-3109:
SOLOMITO, M. A calculation of neutron-induced physical doses in human tissues	A71-29260	STUEVE, C. C. A quantitative approach to performance evaluation of man-machine systems having a stochastic environment	A71-29286
SOTNIKOV, G. G. Photometry application in the ultraviolet and visible spectral regions to the recording of microorganism reproduction in a liquid medium	A71-28682	SUETSUGI, S. Carbon dioxide elimination across human skin	A71-30567
Detection of ferro-porphyrin proteins in extraterrestrial life searches	A71-28684	SULKOWSKI, T. S. CO <sub>2</sub> narcosis in the rat. I - Effects on respiration and blood parameters. II - Effects on the ECG	A71-29364
SOUTH, F. E. A possible basis for periodic arousals during hibernation - Accumulation of ketone bodies	A71-29125	SUMMITT, J. K. Initial evaluation of revised helium-oxygen decompression tables Final report [AD-719388]	N71-24683
SPACH, M. S. Selection of the number and positions of measuring			

## PERSONAL AUTHOR INDEX

VOGEL, J. H. K.

- SUN, K.  
Use of a small computer for averaging evoked brain potentials in a real time scale during long-distance communication  
A71-28385
- SUTHERLAND, H. C., JR.  
Method for assessing A-weighted auditory risk limits for protected ears Final report, May - Oct. 1970  
[AD-719861]  
N71-25086
- SUVOROV, V. V.  
Deficit of heat during the cooling of the cerebrum  
A71-28029
- SYMONS, J. J.  
Zero gravity clothes washer Final report  
[NASA-CR-114983]  
N71-24455
- T**
- TAKALO, K.  
The control of human thermoregulatory heat production, part 2 Final scientific report, 1 Apr. 1966 - 30 Nov. 1970  
[AD-720831]  
N71-25766
- Assessment of regional heat losses for verification of mathematical analogues of the human thermal system, part 1 Final scientific report 1 Apr. 1966 - 30 Apr. 1970  
[AD-720830]  
N71-25953
- TAKEDA, Y. A.  
Alterations in blood coagulation at high altitude  
A71-30278
- TALARICO, K. S.  
Mitotic response to various dietary conditions in the normal and regenerating rat liver  
A71-30069
- TAMMINEN, V.  
Detection of alcohol in aviation and other fatalities in Finland  
A71-29366
- TAUDVIN, P. C.  
Design and development of a microbiological respirometer with space flight applications  
A71-30344
- TAYLOR, B. B.  
Modification of an astronaut's mock up tool kit Final report  
[NASA-CR-103135]  
N71-25533
- TAYLOR, H. L.  
Capacitive electrocardiograph electrodes  
[AD-718958]  
N71-24413
- TEES, R. C.  
Luminance and luminous flux discrimination in rats after early visual deprivation  
A71-28810
- TEPPER, F.  
A carbon dioxide concentrator for space cabin environments  
A71-30313
- TERESHCHENKO, A. P.  
Determination of lipids, proteins, and carbohydrates in Chlorella biomass by pyrolysis and gas chromatography  
A71-28407
- TERRY, F. H.  
Dipole, quadripole, and octapole measurements in isolated beating heart preparations  
A71-28150
- THEODORE, J.  
Toxicological evaluation of carbon monoxide in humans and other mammalian species  
A71-28902
- THOENES, J.  
Evaluation of absorption cycle for space station environmental control system application Interim report  
[NASA-CR-103114]  
N71-26390
- THOMPSON, R.  
Brainstem mechanisms underlying visually guided responses in the rhesus monkey  
A71-28807
- TIBBITS, T. W.  
Circadian rhythm of leaves of Phaseolus angularis plants grown in a controlled carbon dioxide and humidity environment  
A71-29475
- Endogenous short period rhythms in the movements of unifoliate leaves of Phaseolus angularis Wight
- TIMBAL, J.  
Determination of the zone of thermal neutrality in water  
A71-28508
- TISELIUS, A.  
Development of separation methods applied to biochemical materials  
N71-24466
- TOBIAS, C. A.  
Visual phenomena noted by human subjects on exposure to neutrons of energies less than 25 million electron volts  
A71-29353
- TOLE, J. R.  
MITNYS - A hybrid program for on-line analysis of nystagmus  
A71-29359
- TOMLINSON, B. N.  
The simulation of turbulence and its influence on the pilot  
A71-29781
- TORRANCE, J. D.  
Shift of the O<sub>2</sub>-Hb dissociation curve at altitude - Mechanism and effect  
A71-29494
- TROKEL, S. L.  
A protocol for B-scan and radiographic foreign body localization  
A71-29031
- TUCKER, E. M.  
Extravehicular tunnel suit system Patent [NASA-CASE-MSC-12243-1]  
N71-24728
- U**
- UGOLEV, A. M.  
Food-choice and consumption control and metabolism  
A71-28719
- UPTON, H. W.  
Head-mounted display and control system in V/STOL operations  
[AHS PREPRINT 532]  
A71-31093
- URMAKHER, L. S.  
Stereophotogrammetry in ophthalmology  
A71-28012
- USHKOVA, I. N.  
Changes in the physiological properties of muscles as a result of maximum motor loads  
A71-30553
- USTIUSHIN, B. V.  
The problem of estimating vestibular stability  
A71-26414
- V**
- VAN DE WOESTIJNE, K. P.  
Mechanical consequences of airway smooth muscle relaxation  
A71-29497
- VAN VUNAKIS, H.  
Immunochemical studies on pepsinogens A, C and D from the smooth dogfish, *Mustelus Canis*  
A71-29480
- VANDER HAAGEN, G. A.  
Application of cineholomicrography to the study of microcirculation hemodynamics Final report, 1 Feb. 1968 - 31 Dec. 1970  
[AD-719401]  
N71-24684
- VASHKOV, V. I.  
Current methods and means for sterilization of space objects  
A71-28694
- VDOVKIN, G. P.  
Meteorites and life  
A71-28692
- VISIOLI, O.  
Estimation of ventricular mass from the electrocardiogram  
A71-29302
- VOGEL, J. A.  
Species comparison of cardiac hypertrophy in animals chronically exposed to high altitude  
[AD-720596]  
N71-26167
- VOGEL, J. H. K.  
Hypoxia, high altitude and the heart, Proceedings of the First Conference on Cardiovascular Disease, Aspen, Colo., January 11-13, 1970  
A71-30275

- Alterations in blood coagulation at high altitude A71-30278
- Coronary blood flow during short term exposure to high altitude A71-30284
- VOGT, F. B.**
- Capacitive electrocardiograph electrodes [AD-718958] N71-24413
- VOLMIR, A. S.**
- Hydroelastic effects in the aorta bifurcation zone A71-28657
- VOLOKHOVA, N. A.**
- Vestibular reactions A71-28672
- VREELAND, R. W.**
- A compact six-channel integrated circuit EEG telemeter A71-28889
- W**
- WAALER, B. A.**
- The effect of sympathetic nerve stimulation on pulmonary blood volume in isolated perfused lungs A71-31135
- WAINSTEIN, E. S.**
- Rand Symposium on Pilot Training and the Pilot Career Final report [AD-720797] N71-25792
- WARD, B.**
- The metabolism of ingested peroxides Final report, 1 May 1970 - 30 Apr. 1971 [NASA-CR-114998] N71-24553
- WARD, J. L.**
- Studies of multivariable manual control systems - A model for task interference [NASA-CR-17446] N71-26160
- WATSON, J. D.**
- Potential consequences of experimentation with human eggs N71-24763
- WEAVER, R. S.**
- Physical properties of fluids and structures of vestibular apparatus of the pigeon A71-30467
- WEBSTER, W. R.**
- The effects of repetitive stimulation on auditory evoked potentials A71-28892
- WEDIN, B.**
- Experiences in the field of cleanliness technique in Sweden [FOA-1-C-1325-76] N71-26566
- WEETE, J. D.**
- Fatty acid ethyl esters of Rhizopus arrhizus A71-29352
- WEIL, J. V.**
- Evaluation of hypoxic ventilatory drive- findings at high altitude A71-30288
- WEISSING, H.**
- Measurement procedures and range of application of the equivalent permanent sound level A71-29284
- WELCH, B. E.**
- Fluid balance in artificial environments - Role of environmental variables [NASA-CR-114977] N71-25000
  - Fluid balance in artificial environments. 2 - Influence of physiological changes upon rates of skin insensible water loss [NASA-CR-115024] N71-26385
- WENDKOS, M. H.**
- T wave abnormalities in the electrocardiograms of top-ranking athletes without demonstrable organic heart disease A71-30708
- WHEELER, G.**
- Group effects on individual inferences N71-25871
- WHISTLER, C. F.**
- Advanced survival avionics development study Final report, Aug. 1969 - Mar. 1970 [AD-715310] N71-24414
- WHITLOW, D. E.**
- Application of cineholomicrography to the study of microcirculation hemodynamics Final report, 1 Feb. 1968 - 31 Dec. 1970
- [AD-719401] N71-24684
- WIEDMEIER, V. T.**
- Effects of acute and chronic hypoxia on coronary blood flow A71-30281
- WILBURN, D. L.**
- Kinematic analysis of a six degree of freedom vibration table Final report, 1 Sep. 1969 - 15 May 1970 [AD-720269] N71-26158
- WILSON, C. G.**
- Influence of acclimatization on sweat sodium concentration A71-29498
- WOLF, J. J.**
- Digital simulation of the performance of intermediate size crews - Application and validation of a model for crew simulation [AD-720354] N71-26076
- WOLFE, B. N., JR.**
- The effectiveness of selected earmuff-type hearing protectors A71-30196
- WOODSON, W.**
- Databook for human factors engineers. Volume 2 - Common formulas, metrics, definitions [NASA-CR-114272] N71-25943
  - Databook for human factors engineers. Volume 1 - Human engineering data [NASA-CR-114271] N71-25944
- WURTHMAN, R. J.**
- Control of the synthesis of melatonin and other methoxyindoles in the mammalian pineal organ A71-29631
  - Neuroendocrine transducer cells in mammals A71-30180
  - Adrenocortical control of epinephrine synthesis A71-30809
- Y**
- YAMASHIRO, S. M.**
- Optimal regulation of respiratory airflow A71-29491
- YEAGER, C. L.**
- A compact six-channel integrated circuit EEG telemeter A71-28889
- YELVERTON, J. T.**
- The acute effects of air blast on pulmonary function in dogs and sheep Technical progress report [AD-709972] N71-26302
- YOUNG, D. R.**
- Skeletal stressing method and apparatus Patent [NASA-CASE-ARC-10100-1] N71-24738
- YOUNG, L. R.**
- MITNYS - A hybrid program for on-line analysis of nystagmus A71-29359
- YURA, H. T.**
- Induced fields and heating within a cranial structure irradiated by an electromagnetic plane wave [AD-720589] N71-26168
- Z**
- ZAHORIK, D. M.**
- Relative novelty of solid and liquid diet during thiamine deficiency determines development of thiamine-specific hunger A71-28808
- ZALTSMAN, G. L.**
- Dynamics and principles of saturation of an organism with indifferent gases A71-28038
- ZATZMAN, M. L.**
- A possible basis for periodic arousals during hibernation - Accumulation of ketone bodies A71-29125
- ZHGENTI, T. G.**
- Primary mechanism of the action of an electromagnetic field on living organisms A71-30026

# PUBLIC COLLECTIONS OF NASA DOCUMENTS

## DOMESTIC

NASA deposits its technical documents and bibliographic tools in eleven Federal Regional Technical Report Centers located in the organizations listed below. Each center is prepared to furnish the public such services as reference assistance, interlibrary loans, photocopy service, and assistance in obtaining copies of NASA documents for retention.

### CALIFORNIA

University of California, Berkeley

### COLORADO

University of Colorado, Boulder

### DISTRICT OF COLUMBIA

Library of Congress

### GEORGIA

Georgia Institute of Technology, Atlanta

### ILLINOIS

The John Crerar Library, Chicago

### MASSACHUSETTS

Massachusetts Institute of Technology, Cambridge

### MISSOURI

Linda Hall Library, Kansas City

### NEW YORK

Columbia University, New York

### PENNSYLVANIA

Carnegie Library of Pittsburgh

### TEXAS

Southern Methodist University, Dallas

### WASHINGTON

University of Washington, Seattle

NASA publications (those indicated by an "\*" following the accession number) are also received by the following public and free libraries:

### CALIFORNIA

Los Angeles Public Library  
San Diego Public Library

### COLORADO

Denver Public Library

### CONNECTICUT

Hartford Public Library

### DELAWARE

Wilmington Institute Free Library, Wilmington

### MARYLAND

Enoch Pratt Free Library, Baltimore

### MASSACHUSETTS

Boston Public Library

### MICHIGAN

Detroit Public Library

### MINNESOTA

Minneapolis Public Library  
James Jerome Hill Reference Library, St. Paul

### MISSOURI

Kansas City Public Library  
St. Louis Public Library

### NEW JERSEY

Trenton Public Library

### NEW YORK

Brooklyn Public Library  
Buffalo and Erie County Public Library  
Rochester Public Library  
New York Public Library

### OHIO

Akron Public Library  
Cincinnati Public Library  
Cleveland Public Library  
Dayton Public Library  
Toledo Public Library

### OKLAHOMA

Oklahoma County Libraries, Oklahoma City

### TENNESSEE

Cossitt-Goodwin Libraries, Memphis

### TEXAS

Dallas Public Library  
Fort Worth Public Library

### WASHINGTON

Seattle Public Library

### WISCONSIN

Milwaukee Public Library

An extensive collection of NASA and NASA-sponsored documents and aerospace publications available to the public for reference purposes is maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 750 Third Avenue, New York, New York, 10017.

## EUROPEAN

An extensive collection of NASA and NASA-sponsored publications is maintained by the National Lending Library for Science and Technology, Boston Spa, Yorkshire, England. By virtue of arrangements other than with NASA, the National Lending Library also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy or microfiche of NASA and NASA-sponsored documents, those identified by both the symbols "#" and "\*", from: ESRO/ELDO Space Documentation Service, European Space Research Organization, 114, av de Neuilly, 92-Neuilly-sur-Seine, France.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
WASHINGTON, D.C. 20546

OFFICIAL BUSINESS  
PENALTY FOR PRIVATE USE \$300

FIRST CLASS MAIL

POSTAGE AND FEES PAID  
NATIONAL AERONAUTICS AND  
SPACE ADMINISTRATION



POSTMASTER: If Undeliverable (Section 158  
Postal Manual) Do Not Return

*"The aeronautical and space activities of the United States shall be conducted so as to contribute . . . to the expansion of human knowledge of phenomena in the atmosphere and space. The Administration shall provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof."*

— NATIONAL AERONAUTICS AND SPACE ACT OF 1958

## NASA SCIENTIFIC AND TECHNICAL PUBLICATIONS

**TECHNICAL REPORTS:** Scientific and technical information considered important, complete, and a lasting contribution to existing knowledge.

**TECHNICAL NOTES:** Information less broad in scope but nevertheless of importance as a contribution to existing knowledge.

**TECHNICAL MEMORANDUMS:** Information receiving limited distribution because of preliminary data, security classification, or other reasons.

**CONTRACTOR REPORTS:** Scientific and technical information generated under a NASA contract or grant and considered an important contribution to existing knowledge.

**TECHNICAL TRANSLATIONS:** Information published in a foreign language considered to merit NASA distribution in English.

**SPECIAL PUBLICATIONS:** Information derived from or of value to NASA activities. Publications include conference proceedings, monographs, data compilations, handbooks, sourcebooks, and special bibliographies.

**TECHNOLOGY UTILIZATION PUBLICATIONS:** Information on technology used by NASA that may be of particular interest in commercial and other non-aerospace applications. Publications include Tech Briefs, Technology Utilization Reports and Technology Surveys.

*Details on the availability of these publications may be obtained from:*

**SCIENTIFIC AND TECHNICAL INFORMATION OFFICE**

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**

**Washington, D.C. 20546**